(2)

TRAINING & PERSONNEL SYSTEMS TECHNOLOGY

R&D PROGRAM DESCRIPTION
FY93

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

This notebook provides an overview of the Training and Personnel Systems Program for FY93. It has been assembled for use by the laboratory planners, and managers and headquarters personnel in the Services and OSD.

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SUBJECT: Program Description for Training and Personnel Systems Research and Development (R&D)

TO: SEE DISTRIBUTION

1. The Training and Personnel Systems Technology (TPST) R&D Program Description is a product of the Defense Technical Information Center, Manpower and Training Research Information System (MATRIS), San Diego, CA. Data are based on FY93 Congressional Descriptive Summaries provided by the Services and the Office of the Director, Defense Research and Engineering.

2. The Program Description is a reference document that describes R&D technology categories including: (1) manpower and personnel, (2) education and training, (3) simulation and training devices, and (4) human factors and safety. The contents present narrative and fiscal data available from the biennial FY93 program and budget as of March 1992. MATRIS maintains a related online database that is updated as later fiscal information becomes available.

3. This reference document is produced and distributed annually as an aggregation and summary of TPST R&D. Its overview and fiscal summary are intended to encourage and enhance R&D coordination.

4. If additional copies are required, or if there are any questions or comments, please contact the MATRIS Office at (619) 553-7000; DSN 553-7000.

FOR THE ADMINISTRATOR:

Janet S. Hodges

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MATRIS Program Manager

NOTICE
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These pages amend the FY92-93 edition
of the
Training and Personnel Systems Technology
(TPST)
R&D program description issued in August, 1991.

This program description is a product of the
Manpower and Training Research Information System (MATRIS).
For additional information, contact the MATRIS office:
COMMERCIAL: (619) 553-7000
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TABLE OF CONTENTS

I. INTRODUCTION

Purpose

The Training and Personnel Systems Technology (TPST) program includes research and development in (1) manpower and personnel, (2) education and training, (3) simulation and training devices, and (4) human factors. This document summarizes the program from Basic Research (6.1) through Engineering Development (6.4) for FY92 and FY93. It consoldiates information about program elements and their component projects into a tool for laboratory managers, planners, and headquarters personnel in the Service and the Office of the Secretary of Defense.

This program description integrates funding information and summaries of work being conducted by the Service laboratories. It allows the user to locate, extract, and aggregate vital information for decision making and resource commitment.

Section II, which contains fiscal tables and graphs, cross-tabulates FY92 and FY93 funding by Congressional category, DoD organization, and budget category. It present the data in two ways:

(a) Comparison of estimated vs. actual total TPST funding for the President's Budget, 1986-1992, and
(b) Breakdowns of total TPST funding by budget category and Service for FY92 and FY93.

Section III presents program element and project synopses sorted by DoD organization, and describes the products and payoffs of each effort.

How To Use This Book

This document can serve the reader in various ways. The following examples are illustrative rather than comprehensive:

How do Service funding levels compare in FY92 and FY93?

Section II fiscal tables are directly relevant. Tables in subsection II-1 provide a quick overview, breaking down the Services' funding by budget category and by Congressional category for FY92 and FY93 respectively.

What Basic Research (6.1) is planned for FY93?

Plans for FY92 and FY93 can be found in the narrative portion of Section III within the "Synopsis" of each program element for the Service laboratories.

Further Information

The Defense Technical Information Center's Manpower and Training Research Information System (MATRIS) Office compiles this program description from a database it maintains. The data reflects the FY92/93 President's Budget from the Congressional Descriptive Summaries.

The MATRIS database covers the TPST R&D program at the program element, project, work unit and studies and analysis levels. Further information about the TPST program is available from:

MATRIS User Services
Defense Technical Information Center
DTIC-AM
San Diego, CA 92152-6800
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Suggestions and Comments

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II. FISCAL TABLES AND GRAPHS

LIST OF ABBREVIATIONS USED IN FISCAL TABLES

Variable Name	Abbreviation	Used For
CONGRESSIONAL CATEGORY	ET	Education and Training
	HF	Human Factors
	MP	Manpower and Personnel
	ST	Simulation and Training Devices
BUDGET CATEGORY	6.1	Basic Research
	6.2	Exploratory Development
	6.3	Advanced Development
	6.4	Engineering Development
DoD ORGANIZATION	ARMY	Army
	NAVY	Navy and Marine Corps
	AF	Air Force
	DLA	Defense Logistics Agency

TABLE II-1

TPST PROGRAM FUNDING IN 1992
BASED ON FY93 PRESIDENT'S BUDGET

BUDGET CATEGORY BY DOD ORGANIZATION

1992 ($MILLIONS)

DOD ORGANIZATION	BUDGET CATEGORY 6.1	6.2	6.3	6.4	TOTAL
ARMY	5.86	25.23	18.56	63.98	113.63
(ROW%)	(5)	(22)	(16)	(56)	(100)
NAVY	11.25	13.71	16.40	13.26	54.62
(ROW%)	(21)	(25)	(30)	(24)	(100)
AF	9.48	41.73	25.49	44.67	121.37
(ROW%)	(8)	(34)	(21)	(37)	(100)
TOTAL	26.60	80.67	60.45	121.91	289.62
(ROW%)	(9)	(28)	(21)	(42)	(100)

TPST PROGRAM FUNDING IN 1993
BASED ON FY93 PRESIDENT'S BUDGET

BUDGET CATEGORY BY DOD ORGANIZATION

1993 ($MILLIONS)

DOD ORGANIZATION	BUDGET CATEGORY 6.1	6.2	6.3	6.4	TOTAL
ARMY	7.57	35.02	19.46	49.25	111.31
(ROW%)	(7)	(31)	(17)	(44)	(100)
NAVY	13.40	17.97	22.12	6.36	59.85
(ROW%)	(22)	(30)	(37)	(11)	(100)
AF	10.80	48.58	33.27	40.53	133.18
(ROW%)	(8)	(36)	(25)	(30)	(100)
TOTAL	31.77	101.57	74.85	96.14	304.33
(ROW%)	(10)	(33)	(25)	(32)	(100)

TABLE II-2

TPST PROGRAM FUNDING IN 1992
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY DOD ORGANIZATION

1992 ($MILLIONS)

DOD ORGANIZATION	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
ARMY	8.57	20.62	9.02	75.40	113.62
(ROW%)	(8)	(18)	(8)	(66)	(100)
NAVY	11.29	10.51	12.14	20.67	54.61
(ROW%)	(21)	(19)	(22)	(38)	(100)
AF	35.03	44.82	8.43	33.08	121.36
(ROW%)	(29)	(37)	(7)	(27)	(100)
TOTAL	54.89	75.95	29.60	129.15	289.59
(ROW%)	(19)	(26)	(10)	(45)	(100)

TPST PROGRAM FUNDING IN 1993
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY DOD ORGANIZATION

1993 ($MILLIONS)

DOD ORGANIZATION	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
ARMY	15.16	26.35	9.48	60.30	111.30
(ROW%)	(14)	(24)	(9)	(54)	(100)
NAVY	15.20	11.76	15.21	17.67	59.84
(ROW%)	(25)	(20)	(25)	(30)	(100)
AF	29.03	60.70	7.00	36.44	133.16
(ROW%)	(22)	(46)	(5)	(27)	(100)
TOTAL	59.39	98.81	31.69	114.40	304.29
(ROW%)	(20)	(32)	(10)	(38)	(100)

TABLE II-3

TPST PROGRAM FUNDING IN 1992
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY PROGRAM ELEMENT
WITHIN DOD ORGANIZATION

1992 ($MILLIONS)

DOD ORGANIZATION	PROGRAM ELEMENT	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
ARMY						
	61102A	1.71	2.93	1.23	0.00	5.86
	(ROW%)	(29)	(50)	(21)	(0)	(100)
	62716A	0.00	5.85	0.00	0.00	5.85
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	62727A	0.00	0.00	0.00	3.50	3.50
	(ROW%)	(0)	(0)	(0)	(100)	(100)
	62785A	4.03	4.21	3.98	3.65	15.87
	(ROW%)	(25)	(27)	(25)	(23)	(100)
	63003A	0.00	0.00	0.00	2.89	2.89
	(ROW%)	(0)	(0)	(0)	(100)	(100)
	63007A	2.84	7.64	3.81	1.39	15.67
	(ROW%)	(18)	(49)	(24)	(9)	(100)
	64715A	0.00	0.00	0.00	61.09	61.09
	(ROW%)	(0)	(0)	(0)	(100)	(100)
	64801A	0.00	0.00	0.00	2.89	2.89
	(ROW%)	(0)	(0)	(0)	(100)	(100)
ARMY	TOTAL	8.57	20.63	9.03	75.40	113.63
	(ROW%)	(8)	(18)	(8)	(66)	(100)

TABLE II-3

TPST PROGRAM FUNDING IN 1992
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY PROGRAM ELEMENT
WITHIN DOD ORGANIZATION

1992 ($MILLIONS)

DOD ORGANIZATION	PROGRAM ELEMENT	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
NAVY						
	61153N	6.02	2.22	3.01	0.00	11.25
	(ROW%)	(54)	(20)	(27)	(0)	(100)
	62131M	0.00	0.00	0.55	0.00	0.55
	(ROW%)	(0)	(0)	(100)	(0)	(100)
	62233N	1.18	1.79	2.51	4.03	9.51
	(ROW%)	(12)	(19)	(26)	(42)	(100)
	62234N	0.00	3.65	0.00	0.00	3.65
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	63707N	4.09	2.86	1.00	5.16	13.11
	(ROW%)	(31)	(22)	(8)	(39)	(100)
	63732M	0.00	0.00	3.29	0.00	3.29
	(ROW%)	(0)	(0)	(100)	(0)	(100)
	64703N	0.00	0.00	1.79	0.00	1.79
	(ROW%)	(0)	(0)	(100)	(0)	(100)
	64714N	0.00	0.00	0.00	0.83	0.83
	(ROW%)	(0)	(0)	(0)	(100)	(100)
	64715N	0.00	0.00	0.00	10.65	10.65
	(ROW%)	(0)	(0)	(0)	(100)	(100)
NAVY	TOTAL	11.29	10.51	12.15	20.67	54.62
	(ROW%)	(21)	(19)	(22)	(38)	(100)

TABLE II-3

TPST PROGRAM FUNDING IN 1992
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY PROGRAM ELEMENT
WITHIN DOD ORGANIZATION

1992 ($MILLIONS)

DOD ORGANIZATION	PROGRAM ELEMENT	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
AF						
	61102F	0.00	9.48	0.00	0.00	9.48
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	62202F	0.00	12.01	0.00	0.00	12.01
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	62205F	18.33	6.03	5.37	0.00	29.72
	(ROW%)	(62)	(20)	(18)	(0)	(100)
	63106F	0.00	6.15	0.00	0.00	6.15
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	63227F	2.06	0.00	1.73	5.62	9.40
	(ROW%)	(22)	(0)	(18)	(60)	(100)
	63231F	0.00	9.94	0.00	0.00	9.94
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	64227F	13.99	0.00	0.70	27.47	42.16
	(ROW%)	(33)	(0)	(2)	(65)	(100)
	64243F	0.66	1.22	0.64	0.00	2.51
	(ROW%)	(26)	(49)	(25)	(0)	(100)
AF	TOTAL	35.03	44.83	8.43	33.09	121.37
	(ROW%)	(29)	(37)	(7)	(27)	(100)
DOD TOTAL		54.90	75.97	29.60	129.16	289.62
	(ROW%)	(19)	(26)	(10)	(45)	(100)

TABLE II-3

TPST PROGRAM FUNDING IN 1993
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY PROGRAM ELEMENT
WITHIN DOD ORGANIZATION

1993 ($MILLIONS)

DOD ORGANIZATION	PROGRAM ELEMENT	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
ARMY						
	61102A	1.98	4.04	1.54	0.00	7.57
	(ROW%)	(26)	(53)	(20)	(0)	(100)
	62716A	0.00	10.57	0.00	0.00	10.57
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	62727A	0.00	0.00	0.00	8.48	8.48
	(ROW%)	(0)	(0)	(0)	(100)	(100)
	62785A	7.90	4.28	3.79	0.00	15.97
	(ROW%)	(49)	(27)	(24)	(0)	(100)
	63003A	0.00	0.00	0.00	2.56	2.56
	(ROW%)	(0)	(0)	(0)	(100)	(100)
	63007A	5.28	7.47	4.15	0.00	16.90
	(ROW%)	(31)	(44)	(25)	(0)	(100)
	64715A	0.00	0.00	0.00	42.55	42.55
	(ROW%)	(0)	(0)	(0)	(100)	(100)
	64801A	0.00	0.00	0.00	6.70	6.70
	(ROW%)	(0)	(0)	(0)	(100)	(100)
ARMY	TOTAL	15.16	26.36	9.49	60.30	111.31
	(ROW%)	(14)	(24)	(9)	(54)	(100)

TABLE II-3

TPST PROGRAM FUNDING IN 1993
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY PROGRAM ELEMENT
WITHIN DOD ORGANIZATION

1993 ($MILLIONS)

DOD ORGANIZATION	PROGRAM ELEMENT	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
NAVY						
	61153N	7.41	2.81	3.18	0.00	13.40
	(ROW%)	(55)	(21)	(24)	(0)	(100)
	62131M	0.00	0.00	0.55	0.00	0.55
	(ROW%)	(0)	(0)	(100)	(0)	(100)
	62233N	1.46	1.90	3.23	6.97	13.55
	(ROW%)	(11)	(14)	(24)	(51)	(100)
	62234N	0.00	3.87	0.00	0.00	3.87
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	63707N	6.33	3.19	3.45	5.49	18.46
	(ROW%)	(34)	(17)	(19)	(30)	(100)
	63732M	0.00	0.00	3.66	0.00	3.66
	(ROW%)	(0)	(0)	(100)	(0)	(100)
	64703N	0.00	0.00	1.14	0.00	1.14
	(ROW%)	(0)	(0)	(100)	(0)	(100)
	64714N	0.00	0.00	0.00	2.12	2.12
	(ROW%)	(0)	(0)	(0)	(100)	(100)
	64715N	0.00	0.00	0.00	3.10	3.10
	(ROW%)	(0)	(0)	(0)	(100)	(100)
NAVY	TOTAL	15.20	11.76	15.21	17.68	59.85
	(ROW%)	(25)	(20)	(25)	(30)	(100)

TABLE II-3

TPST PROGRAM FUNDING IN 1993
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY PROGRAM ELEMENT
WITHIN DOD ORGANIZATION

1993 ($MILLIONS)

DOD ORGANIZATION	PROGRAM ELEMENT	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
AF						
	61102F	0.00	10.80	0.00	0.00	10.80
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	62202F	0.00	15.80	0.00	0.00	15.80
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	62205F	20.22	7.38	5.18	0.00	32.78
	(ROW%)	(62)	(23)	(16)	(0)	(100)
	63106F	0.00	14.99	0.00	0.00	14.99
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	63227F	2.45	0.00	1.23	5.91	9.59
	(ROW%)	(26)	(0)	(13)	(62)	(100)
	63231F	0.00	8.69	0.00	0.00	8.69
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	64227F	6.20	0.00	0.50	30.53	37.23
	(ROW%)	(17)	(0)	(1)	(82)	(100)
	64243F	0.15	3.05	0.10	0.00	3.30
	(ROW%)	(5)	(92)	(3)	(0)	(100)
AF	TOTAL	29.03	60.70	7.00	36.44	133.18
	(ROW%)	(22)	(46)	(5)	(27)	(100)
DOD TOTAL		59.39	98.82	31.70	114.41	304.33
	(ROW%)	(20)	(32)	(10)	(38)	(100)

TABLE II-4

TPST PROGRAM FUNDING IN 1992
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY BUDGET CATEGORY
1992 ($MILLIONS)

BUDGET CATEGORY	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
6.1	7.73	14.63	4.24	0.00	26.60
(ROW%)	(29)	(55)	(16)	(0)	(100)
6.2	23.54	33.53	12.41	11.18	80.65
(ROW%)	(29)	(42)	(15)	(14)	(100)
6.3	8.98	26.57	9.82	15.06	60.44
(ROW%)	(15)	(44)	(16)	(25)	(100)
6.4	14.64	1.22	3.13	102.91	121.90
(ROW%)	(12)	(1)	(3)	(84)	(100)
TOTAL	54.89	75.95	29.60	129.15	289.59
(ROW%)	(19)	(26)	(10)	(45)	(100)

TPST PROGRAM FUNDING IN 1993
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY BUDGET CATEGORY
1993 ($MILLIONS)

BUDGET CATEGORY	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
6.1	9.39	17.65	4.72	0.00	31.76
(ROW%)	(30)	(56)	(15)	(0)	(100)
6.2	29.59	43.78	12.74	15.45	101.55
(ROW%)	(29)	(43)	(13)	(15)	(100)
6.3	14.06	34.33	12.49	13.96	74.84
(ROW%)	(19)	(46)	(17)	(19)	(100)
6.4	6.35	3.05	1.74	85.00	96.13
(ROW%)	(7)	(3)	(2)	(88)	(100)
TOTAL	59.39	98.81	31.69	114.40	304.29
(ROW%)	(20)	(32)	(10)	(38)	(100)

TABLE II-5

TPST PROGRAM FUNDING IN 1992
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY BUDGET CATEGORY
WITHIN DOD ORGANIZATION

1992 ($MILLIONS)

DOD ORGANIZATION	BUDGET CATEGORY	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
ARMY						
	6.1	1.71	2.93	1.23	0.00	5.86
	(ROW%)	(29)	(50)	(21)	(0)	(100)
	6.2	4.03	10.06	3.98	7.15	25.22
	(ROW%)	(16)	(40)	(16)	(28)	(100)
	6.3	2.84	7.63	3.81	4.28	18.56
	(ROW%)	(15)	(41)	(21)	(23)	(100)
	6.4	0.00	0.00	0.00	63.98	63.98
	(ROW%)	(0)	(0)	(0)	(100)	(100)
ARMY	TOTAL	8.57	20.62	9.02	75.40	113.62
	(ROW%)	(8)	(18)	(8)	(66)	(100)

TABLE II-5

TPST PROGRAM FUNDING IN 1992
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY BUDGET CATEGORY
WITHIN DOD ORGANIZATION

1992 ($MILLIONS)

DOD ORGANIZATION	BUDGET CATEGORY	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
NAVY						
	6.1	6.02	2.22	3.01	0.00	11.25
	(ROW%)	(54)	(20)	(27)	(0)	(100)
	6.2	1.18	5.43	3.06	4.03	13.70
	(ROW%)	(9)	(40)	(22)	(29)	(100)
	6.3	4.09	2.85	4.29	5.16	16.39
	(ROW%)	(25)	(17)	(26)	(32)	(100)
	6.4	0.00	0.00	1.79	11.47	13.26
	(ROW%)	(0)	(0)	(13)	(87)	(100)
NAVY	TOTAL	11.29	10.51	12.14	20.67	54.61
	(ROW%)	(21)	(19)	(22)	(38)	(100)

TABLE II-5

TPST PROGRAM FUNDING IN 1992
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY BUDGET CATEGORY
WITHIN DOD ORGANIZATION

1992 ($MILLIONS)

DOD ORGANIZATION	BUDGET CATEGORY	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
AF						
	6.1	0.00	9.48	0.00	0.00	9.48
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	6.2	18.33	18.03	5.37	0.00	41.73
	(ROW%)	(44)	(43)	(13)	(0)	(100)
	6.3	2.06	16.09	1.73	5.62	25.49
	(ROW%)	(8)	(63)	(7)	(22)	(100)
	6.4	14.64	1.22	1.34	27.46	44.66
	(ROW%)	(33)	(3)	(3)	(61)	(100)
AF	TOTAL	35.03	44.82	8.43	33.08	121.36
	(ROW%)	(29)	(37)	(7)	(27)	(100)
DOD	TOTAL	54.89	75.95	29.60	129.15	289.59
	(ROW%)	(19)	(26)	(10)	(45)	(100)

TABLE II-5

TPST PROGRAM FUNDING IN 1993
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY BUDGET CATEGORY
WITHIN DOD ORGANIZATION

1993 ($MILLIONS)

DOD ORGANIZATION	BUDGET CATEGORY	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
ARMY						
	6.1	1.98	4.04	1.54	0.00	7.57
	(ROW%)	(26)	(53)	(20)	(0)	(100)
	6.2	7.90	14.85	3.79	8.48	35.02
	(ROW%)	(23)	(42)	(11)	(24)	(100)
	6.3	5.28	7.47	4.15	2.56	19.46
	(ROW%)	(27)	(38)	(21)	(13)	(100)
	6.4	0.00	0.00	0.00	49.25	49.25
	(ROW%)	(0)	(0)	(0)	(100)	(100)
ARMY	TOTAL	15.16	26.35	9.48	60.30	111.30
	(ROW%)	(14)	(24)	(9)	(54)	(100)

TABLE II-5

TPST PROGRAM FUNDING IN 1993
BASED ON FY93 PRESIDENT'S BUDGET

CONGRESSIONAL CATEGORY BY BUDGET CATEGORY
WITHIN DOD ORGANIZATION

1993 ($MILLIONS)

DOD ORGANIZATION	BUDGET CATEGORY	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
NAVY						
	6.1	7.41	2.81	3.18	0.00	13.40
	(ROW%)	(55)	(21)	(24)	(0)	(100)
	6.2	1.46	5.76	3.78	6.96	17.97
	(ROW%)	(8)	(32)	(21)	(39)	(100)
	6.3	6.32	3.19	7.11	5.49	22.12
	(ROW%)	(29)	(14)	(32)	(25)	(100)
	6.4	0.00	0.00	1.14	5.22	6.36
	(ROW%)	(0)	(0)	(18)	(82)	(100)
NAVY	TOTAL	15.20	11.76	15.21	17.67	59.84
	(ROW%)	(25)	(20)	(25)	(30)	(100)

TABLE II-5

TPST PROGRAM FUNDING IN 1993
BASED ON FY93 PRESIDENT'S BUDGET

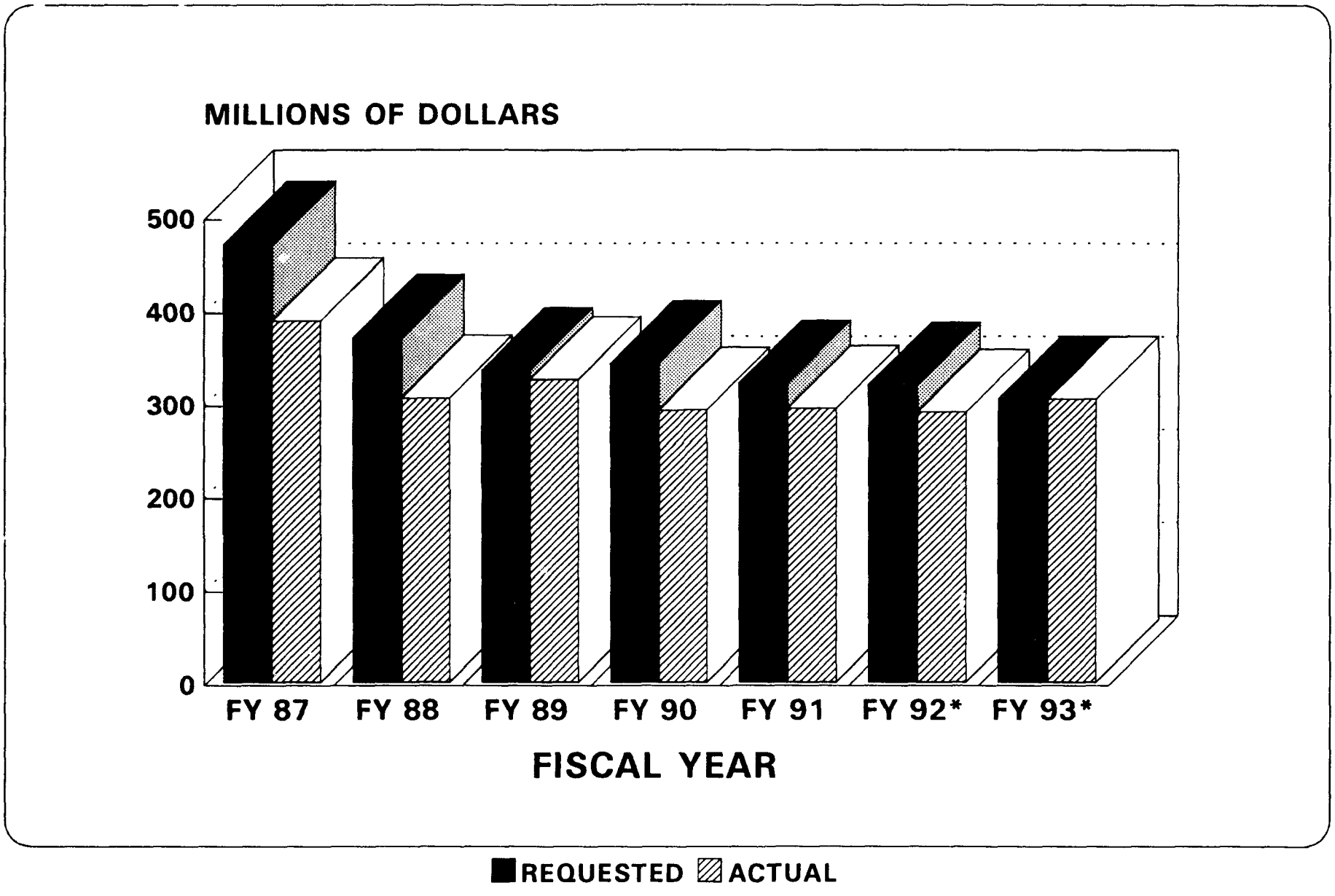
CONGRESSIONAL CATEGORY BY BUDGET CATEGORY
WITHIN DOD ORGANIZATION

1993 ($MILLIONS)

DOD ORGANIZATION	BUDGET CATEGORY	CONGRESSIONAL CATEGORY ET	HF	MP	ST	TOTAL
AF						
	6.1	0.00	10.80	0.00	0.00	10.80
	(ROW%)	(0)	(100)	(0)	(0)	(100)
	6.2	20.22	23.17	5.17	0.00	48.57
	(ROW%)	(42)	(48)	(11)	(0)	(100)
	6.3	2.45	23.68	1.23	5.91	33.27
	(ROW%)	(7)	(71)	(4)	(18)	(100)
	6.4	6.35	3.05	0.60	30.52	40.52
	(ROW%)	(16)	(8)	(1)	(75)	(100)
AF	TOTAL	29.03	60.70	7.00	36.44	133.16
	(ROW%)	(22)	(46)	(5)	(27)	(100)
DOD	TOTAL	59.39	98.81	31.69	114.40	304.29
	(ROW%)	(20)	(32)	(10)	(38)	(100)

REQUESTED VS ACTUAL PROGRAM FUNDING

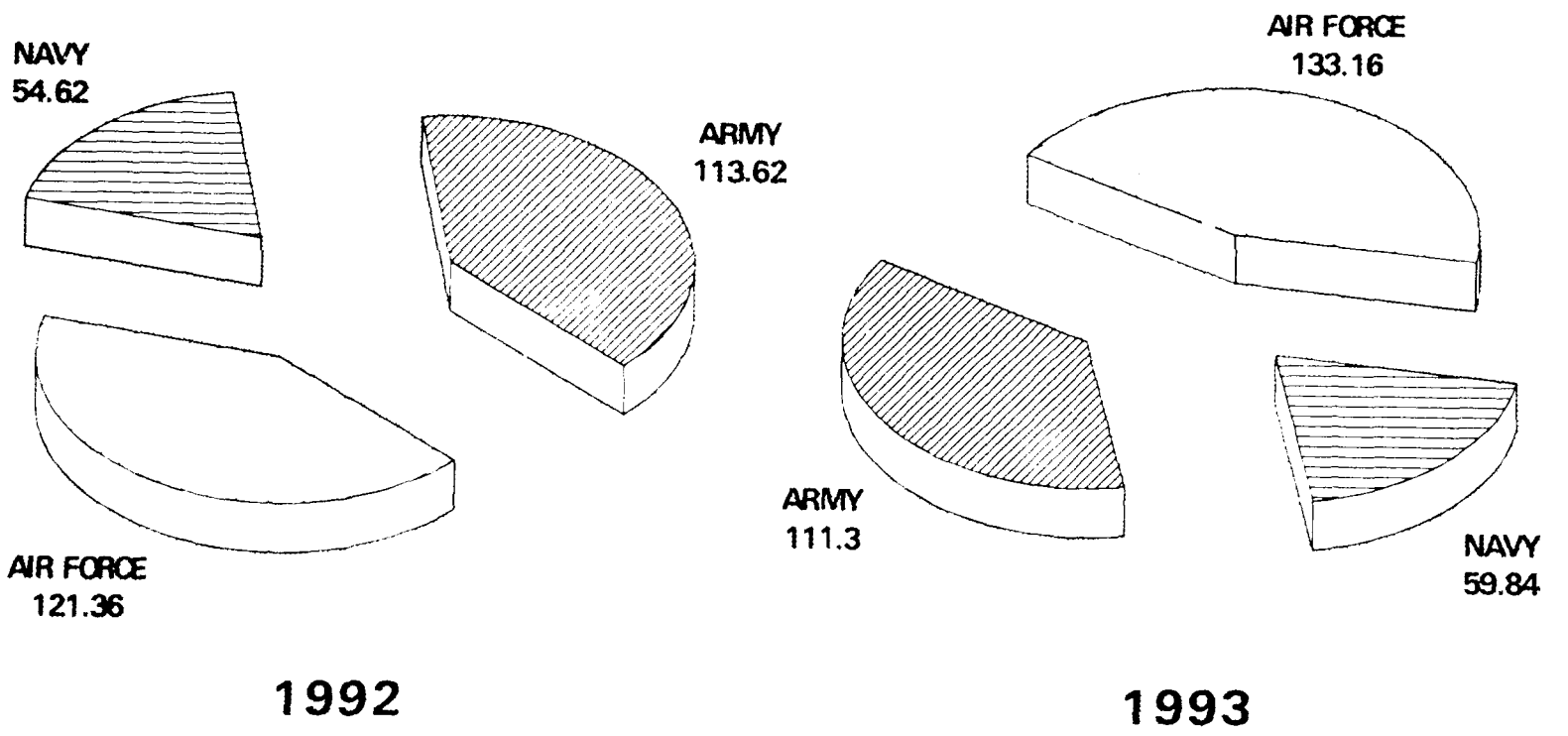
BASED ON THE PRESIDENT'S BUDGET



* ESTIMATED

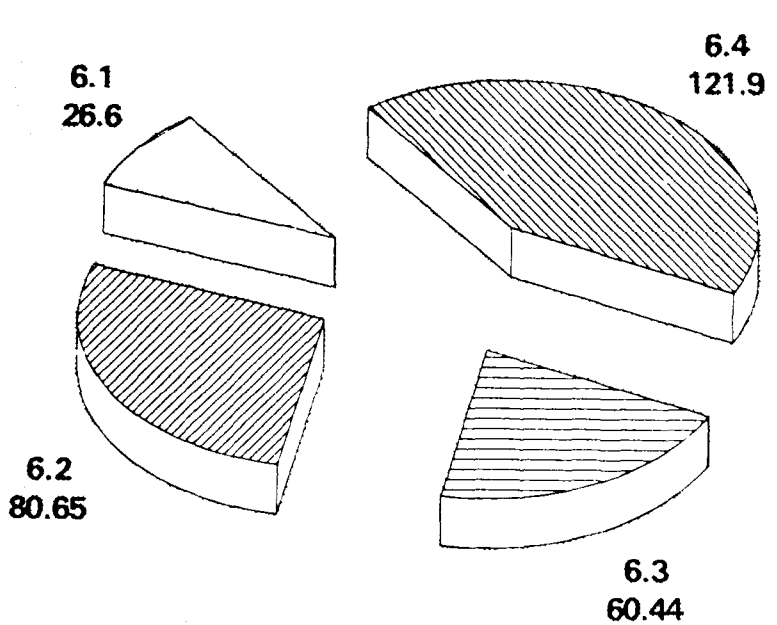
Graph 1

TPST PROGRAM FUNDING BASED ON THE FY93 PRESIDENT'S BUDGET
BY SERVICE

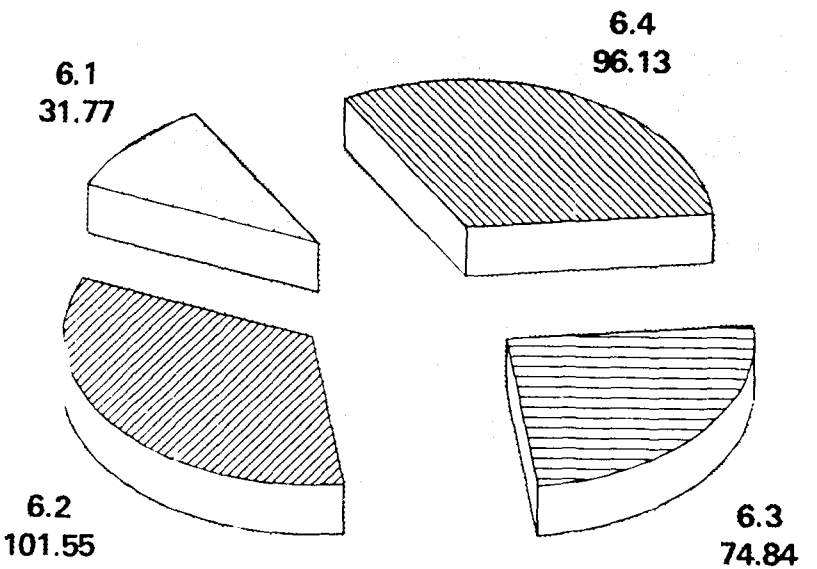


Graph 2

TPST PROGRAM FUNDING BASED ON THE FY93 PRESIDENT'S BUDGET
BY BUDGET CATEGORY



1992



1993

Graph 3

TRAINING AND PERSONNEL SYSTEMS TECHNOLOGY
PROGRAM FUNDING BY SERVICE - JAN 1992

PE	TITLE	($ MILLIONS) FY90	FY91	FY92	FY93
ARMY					
61102A	DEFENSE RESEARCH SCIENCES	5.9	5.6	5.9	7.6
62716A	HUMAN FACTORS ENGINEERING TECHNOLOGY	11.7	11.9	5.9	10.6
62717A	HUMAN PERFORMANCE EFFECTIVENESS AND SIMULATION	0.0	0.0	0.0	0.0
62722A	MANPOWER, PERSONNEL AND TRAINING	0.0	0.0	0.0	0.0
62727A	NON-SYSTEM TRAINING DEVICE TECHNOLOGY	5.0	6.3	3.5	8.5
62785A	MANPOWER, PERSONNEL, AND TRAINING TECHNOLOGY	17.4	18.2	15.9	16.0
63003A	AVIATION ADVANCED TECHNOLOGY	1.9	1.8	2.9	2.6
63007A	HUMAN FACTORS, PERSONNEL AND TRAINING ADVANCED TECHNOLOGY	18.1	19.2	15.7	16.9
63216A	SYNTHETIC FLIGHT SIMULATOR DEVELOPMENT	0.0	0.0	0.0	0.0
63731A	MANPOWER AND PERSONNEL	0.0	0.0	0.0	0.0
63736A	HUMAN FACTORS ENGINEERING APPLICATIONS	0.0	0.0	0.0	0.0
63738A	NON-SYSTEM TRAINING DEVICES (NSTD) ADVANCED DEVELOPMENT	0.0	0.0	0.0	0.0
63739A	HUMAN FACTORS IN TRAINING AND OPERATIONAL EFFECTIVENESS	0.0	0.0	0.0	0.0
63743A	EDUCATION AND TRAINING	0.0	0.0	0.0	0.0
63744A	TRAINING SIMULATION	0.0	0.0	0.0	0.0
64217A	SYNTHETIC FLIGHT TRAINING SYSTEMS	0.0	0.0	0.0	0.0
64715A	NON-SYSTEM TRAINING DEVICES - ENGINEERING DEVELOPMENT	19.7	31.5	61.1	42.6
64722A	EDUCATION AND TRAINING SYSTEMS DEVELOPMENT	0.0	0.0	0.0	0.0
64801A	AVIATION-ENGINEERING DEVELOPMENT	6.5	10.1	2.9	6.8
	SUBTOTAL - ARMY :	85.9	104.2	113.6	111.3

NAVY

61153N	DEFENSE RESEARCH SCIENCES, SUBELEMENT 42: COGNITIVE AND NEURAL SCIENCES	12.6	13.6	11.3	13.4
62131M	MARINE CORPS LANDING FORCE TECHNOLOGY	0.6	0.6	0.6	0.6
62233N	MISSION SUPPORT TECHNOLOGY: PERSONNEL, TRAINING AND SIMULATION TECHNOLOGY AREA	8.4	10.5	9.6	13.6
62234N	SYSTEMS SUPPORT TECHNOLOGY: HUMAN FACTORS TECHNOLOGY AREA	4.4	4.3	3.7	3.9
62744N	MARINE CORPS AIR-GROUND TECHNOLOGY	0.0	0.0	0.0	0.0
62757N	HUMAN FACTORS AND SIMULATION TECHNOLOGY	0.0	0.0	0.0	0.0
62763N	PERSONNEL AND TRAINING TECHNOLOGY	0.0	0.0	0.0	0.0
63701N	HUMAN FACTORS ENGINEERING DEVELOPMENT	2.5	0.1	0.1	0.1
63707N	MANPOWER, PERSONNEL, AND TRAINING ADVANCED TECHNOLOGY	3.1	16.9	13.2	18.5
63710N	MAN-MACHINE TECHNOLOGY	0.0	0.0	0.0	0.0
63720N	EDUCATION AND TRAINING	5.2	0.0	0.0	0.0
63727N	ADVANCED TECHNOLOGY FOR LOGISTICS INFORMATION	0.0	0.0	0.0	0.0
63732M	MARINE CORPS ADVANCED MANPOWER/TRAINING SYSTEMS	4.0	3.1	3.3	3.7
63733N	SIMULATION AND TRAINING DEVICE TECHNOLOGY	1.8	0.0	0.0	0.0
63739N	NAVY LOGISTICS PRODUCTIVITY	0.0	0.0	0.0	0.0
64703N	PERSONNEL, TRAINING, SIMULATION, AND HUMAN FACTORS	1.0	1.1	1.8	1.2
64709N	JOINT SERVICE MANPOWER/PERSONNEL PROTOTYPES	0.0	0.0	0.0	0.0
64714N	AIR WARFARE TRAINING DEVICES	0.0	0.1	0.9	2.2
64715N	SURFACE WARFARE TRAINING DEVICES	17.0	14.2	10.7	3.1
64716N	SUBMARINE WARFARE TRAINING DEVICES	0.0	0.0	0.0	0.0
	SUBTOTAL - NAVY :	60.0	63.8	54.6	59.8

TRAINING AND PERSONNEL SYSTEMS TECHNOLOGY
PROGRAM FUNDING BY SERVICE - JAN 1992

($ MILLIONS)

PE	TITLE	FY90	FY91	FY92	FY93
AIR FORCE					
61102F	DEFENSE RESEARCH SCIENCES	10.0	11.3	9.5	10.8
62202F	HUMAN SYSTEMS TECHNOLOGY	16.6	15.1	12.1	15.8
62205F	PERSONNEL, TRAINING, AND SIMULATION	27.6	29.8	29.8	32.8
62703F	PERSONNEL UTILIZATION TECHNOLOGY	0.0	0.0	0.0	0.0
63106F	LOGISTICS SYSTEMS TECHNOLOGY	8.9	11.1	6.2	15.0
63227F	PERSONNEL, TRAINING, AND SIMULATION TECHNOLOGY	7.2	7.9	9.5	9.6
63231F	CREW SYSTEMS AND PERSONNEL PROTECTION TECHNOLOGY	9.9	9.3	10.0	8.7
63365F	SPACE BIOTECHNOLOGY	0.0	0.0	0.0	0.0
63704F	MANPOWER AND PERSONNEL SYSTEMS TECHNOLOGY	0.0	0.0	0.0	0.0
63751F	TRAINING SYSTEMS TECHNOLOGY	0.0	0.0	0.0	0.0
64227F	TRAINING SYSTEMS DEVELOPMENT	51.4	38.5	42.2	37.3
64243F	MANPOWER, PERSONNEL, AND TRAINING DEVELOPMENT	4.4	3.7	2.6	3.3
	SUBTOTAL - AIR FORCE:	135.6	126.3	121.4	133.2
DLA					
64722S	DOD SUPPORT ACTIVITIES	5.1	0.0	0.0	0.0
	SUBTOTAL - DLA :	5.0	0.0	0.0	0.0
	TOTAL:	286.4	294.3	289.6	304.3

TRAINING AND PERSONNEL TECHNOLOGY RESEARCH ORGANIZATIONS

ARMY

AVSCOM	Army Aviation Systems Center
ARI	Army Research Institute
HEL	Army Human Engineering Laboratory
PM TRADE	Project Manager for Training Devices
TRADOC	Army Training and Doctrine Command

NAVY

HQMC	Headquarters, US Marine Corps
NADC	Naval Air Development Center
NAMRL	Naval Aerospace Medical Research Laboratory
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
NOSC	Naval Ocean Systems Center
NPRDC	Navy Personnel Research and Development Center
NSWC	Naval Surface Weapons Center
NTSC	Naval Training Systems Center
ONR	Office of Naval Research

AIR FORCE

AAMRL	Armstrong Aerospace Medical Research Laboratory
AL	Armstrong Laboratory
AFOSR	Air Force Office of Scientific Research
AMD	Aerospace Medical Division
TS Sro	Deputy for Training Systems
HSD	Human Systems Division

DLA

DLA	Defense Logistics Agency
TPDC	Training Performance Data Center
FM&P	Force Management & Personnel

III.A. ARMY PROGRAM ELEMENT AND PROJECT SYNOPSES

PROGRAM ELEMENT OVERVIEW

PE: 61102A DEFENSE RESEARCH SCIENCES

CONGRESSIONAL CATEGORY: EDUCATION & TRAINING
HUMAN FACTORS
MANPOWER & PERSONNEL
SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: ARMY

FUNDING: FY92 $ 5.9M (FY93 PRESIDENT'S BUDGET)
FY93 $ 7.6M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of the Manpower, Personnel and Training (MPT) portion of this Program Element is to produce data, concepts, and technology needed to support applied R&D advances in MPT.

This is the U.S. Army core research program to sustain the science and engineering base required to exploit new opportunities in rapidly advancing technological fields. The program supports theoretical and experimental research in the physical, mathematical, biological, environmental, terrestrial and behavioral sciences. This research is focused on the Army's key goals for effectiveness in the air-land battle environment and the Army 21 concept to provide a lethal, integrated, supportable, highly mobile force with enhanced soldier effectiveness. Research areas are determined and prioritized in order to meet Army needs as stated in mission area analyses and in Army 21, and to exploit scientific opportunities. This core research program is complemented by the inter-disciplinary research performed under the University Research Initiative (URI) program.

The work in this Program Element is consistent with the resource constrained Army Technology Base Master Plan, Science and Technology Objectives (STOs) milestones for the Army's key emerging technologies, and force modernization plans.

There are 33 Army laboratories and activities responsible for this program.

RELATED ACTIVITIES:

Program Element #0601103D, University Research Initiative; the Navy, Air Force, and other Department of Defense agencies; National Aeronautics and Space Administration; National Science Foundation; Department of the Interior; Department of Energy; National Bureau of Standards; other Government agencies; and government agencies of Allied nations sponsor related research in areas of this program.

Coordination to eliminate duplication is accomplished by: (a) tri-Service topical reviews, (b) exchange of progress reports and technical reports, (c) inter-Service/agency liaison, and (d) formal national and international meetings and symposia. Informal coordination occurs through: (a) visits to governmental, industrial, and academic laboratories and installations, (b) review of the scientific literature, and (c) publications of current research. The Army's Defense Research Sciences Program is included in the tri-Service Technology Coordinating Papers.

The Army Research Office, which is the Army's primary interface to the university community, maintains cognizance of free-world research that is potentially relevant to the Army in addition to maintaining liaison offices in Japan and Europe.

There is no unnecessary duplication of effort in the Army or DoD.

PAYOFF/UTILIZATION:

The payoff of the MPT portion of this Program Element is a behavioral science base on which to build new technologies to improve the effectiveness of soldiers and systems.

This basic research's contribution to the Army lies substantially in seeking new exploratory and advanced development to enhance soldier performance and behavior, and in enlisting civilian scientific skills and facilities (university and industry) to cooperatively address Army needs to explore and transition new technologies into applications to solve Army personnel problems.

PROJECT OVERVIEW

		92	93
PROJECT: B74A	HUMAN ENGINEERING	$ 2.5M	$ 3.2M
PE: 61102A	DEFENSE RESEARCH SCIENCES		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	ARMY HUMAN ENGINEERING LABORATORY		

PROJECT SYNOPSIS:

The objective of this Project is to support research in soldier performance, sensor/information processing and other elements of soldier-machine interface critical to the design of Army weapons systems.

In FY92, plans include to: (a) continue soldier visual performance research to determine the allocation of visual attention in various displayed scenes and identify the effects of various visual target characteristics on aided target detection and acquisition, (b) continue to determine and exploit basic soldier-machine acoustic phenomena to apply to the design of communication equipment so that it is more effective in high noise level operational contexts. Expand research into the basic psychoacoustic and interpretive processes associated with the detection, identification and localization of complex sounds in time-varying backgrounds, (c) complete development of a metric to assess acute soldier combat-like stress in a variety of military operations and settings. Determine a measure, valid across different settings, to (1) predict solder/system performance under stress; (2) measure stress; and (3) provide direct input into the development of design guidelines for crew-served weapons, and (d) continue solder performance research efforts to provide information and models critical to the development of information and video display systems for the navigation of teleoperated military vehicles by soldiers. Determine pixels and grey levels required for recognition of obstacles and perceptibility of landmark cues as a function of resolution.

In FY93, plans include to: (a) extend previous soldier visual performance research on the allocation of visual attention in displayed scenes and develop a model of visual search and target acquisition performance in static scenes, (b) continue soldier acoustic research efforts extending current theories of signal detection to the detection of complex transient sound. Evaluate acoustic factors that affect the character of sound at the sensors location given various backgrounds, atmospheric conditions and ground surfaces. Initiate development of psychoacoustic and physical acoustic models to predict critical detection parameters, (c) continue solder performance research efforts to provide information and models critical to the development of information and video display systems for the navigation of teleoperated military vehicles by soldiers. Conduct simulations to examine the ability of subjects to effectively navigate teleoperated vehicles as a function of the quality and quantity of displayed information and terrain conditions. Initiate studies of map-reading, orienting, wayfinding, path selecting and detour negotiating performance in order to develop an adaptive navigational aid applicable to remote operations, and (d) conduct solder performance experiments under conditions simulating noise fields for incoming artillery. Various signature scenarios will be presented to company size groups of soldiers and the changes in performance associated with conceptual weapons and equipment in a hostile environment will be qualified and assessed.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments for this Project include: (a) continued efforts to develop a metric to assess acute combat-like stress in a variety of military operations and settings, (b) expanded research efforts in visual detection and recognition to further develop the visual application to aided target recognition systems, (c) development of a metric to be used in evaluating the effect of speech intelligibility on crew performance for application in combined arms operations, and (d) conducted research on the quality and quantity of visual information required for soldiers to effectively employ teleoperated systems which rely on indirect, processed, or otherwise altered presentation of visual information for target acquisition, driving, or other mission critical functions.

PROJECT OVERVIEW

		92	93
PROJECT: B74F-ET	PERSONNEL PERFORMANCE AND TRAINING	$ 1.7M	$ 2.0M
PE: 61102A	DEFENSE RESEARCH SCIENCES		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	ARMY RESEARCH INSTITUTE		

PROJECT SYNOPSIS:

The objective of this Project is to conduct behavioral science research in the following areas of human performance: (a) variables and processes determining effective group functioning, leader-group interaction, and decision-making, (b) factors that determine effective, low error human performance in decision-making and complex equipment operation in stressful military environments, and (c) principles for technology-based instructional methods that promote the learning of cognitive, perceptual-motor, and unit-performance tasks by individuals and groups.

This Task supports the Education and Training (ET) portion of this Project.

In FY92, plans are to: (a) determine behavorial analysis of human communication processes and how they influence group problem solving and decision making in realistic environments, (b) identify key variables responsible for the motivation of group performance, and (c) further define procedures for predicting human sensitivity to stress and develop hypotheses for maximizing resistance to it.

In FY93, plans are to: (a) continue research on human communicative processes for spatially-separated but electronically-linked individuals and groups, (b) investigate role of time-of-day factors with respect to irregular work schedules, accidents and human performance error, and task execution after rapid time-zone change, (c) develop theoretical understanding of personality factors that lead to enhanced job motivation, performance under stress, and performance in irregular work schedules, and (d) explore cultural variables as factors in performance effectiveness of individuals and groups.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) exploring relevant variables and individual-organizational relationships that determine successful decision making and problem solving in hierarchical organizations, with particular attention to crisis situations, (b) determining learning and reasoning principles that are central to such high level activities as formation of complex concepts, automatic performance of high mental workload tasks, and long term skill retention, (c) determination of separate and combined effects of personality, motivation, and time-of-day factors on the performance of cognitive tasks, and (d) defining research methods and concepts related to the military sociology of the American soldier, focusing on the non-commissioned officer.

PROJECT OVERVIEW

		92	93
PROJECT: B74F-HF	PERSONNEL PERFORMANCE AND TRAINING	$ 0.5M	$ 0.8M
PE: 61102A	DEFENSE RESEARCH SCIENCES		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	ARMY RESEARCH INSTITUTE		

PROJECT SYNOPSIS:

The objective of this Project is to conduct behavioral science research in the following areas of human performance: (a) variables and processes determining effective group functioning, leader-group interaction, and decision-making, (b) factors that determine effective, low error human performance in decision-making and complex equipment operation in stressful military environments, and (c) principles for technology-based instructional methods that promote the learning of cognitive, perceptual-motor, and unit-performance tasks by individuals and groups.

This Task supports the Human Factors (HF) portion of this Project.

In FY92, plans are to: (a) determine behavorial analysis of human communication processes and how they influence group problem solving and decision making in realistic environments, (b) identify key variables responsible for the motivation of group performance, and (c) further define procedures for predicting human sensitivity to stress and develop hypotheses for maximizing resistance to it.

In FY93, plans are to: (a) continue research on human communicative processes for spatially-separated but electronically-linked individuals and groups, (b) investigate role of time-of-day factors with respect to irregular work schedules, accidents and human performance error, and task-execution after rapid time-zone change, (c) develop theoretical understanding of personality factors that lead to enhanced job motivation, performance under stress, and performance in irregular work schedules, and (d) explore cultural variables as factors in performance effectiveness of individuals and groups.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) exploring relevant variables and individual-organizational relationships that determine successful decision making and problem solving in hierarchical organizations, with particular attention to crisis situations, (b) determining learning and reasoning principles that are central to such high level activities as formation of complex concepts, automatic performance of high mental workload tasks, and long term skill retention, (c) determination of separate and combined effects of personality, motivation, and time-of-day factors on the performance of cognitive tasks, and (d) defining research methods and concepts related to the military sociology of the American soldier, focusing on the non-commissioned officer.

PROJECT OVERVIEW

		92	93
PROJECT: B74F-MP	PERSONNEL PERFORMANCE AND TRAINING	$ 1.2M	$ 1.5M
PE: 61102A	DEFENSE RESEARCH SCIENCES		
CONGRESSIONAL CATEGORY:	MANPOWER & PERSONNEL		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	ARMY RESEARCH INSTITUTE		

PROJECT SYNOPSIS:

The objective of this Project is to conduct behavioral science research in the following areas of human performance: (a) variables and processes determining effective group functioning, leader-group interaction, and decision-making, (b) factors that determine effective, low error human performance in decision-making and complex equipment operation in stressful military environments, and (c) principles for technology-based instructional methods that promote the learning of cognitive, perceptual-motor, and unit-performance tasks by individuals and groups.

This Task supports the Manpower and Personnel (MP) portion of this Project.

In FY92, plans are to: (a) determine behavorial analysis of human communication processes and how they influence group problem solving and decision making in realistic environments, (b) identify key variables responsible for the motivation of group poerformance, and (c) further define procedures for predicting human sensitivity to stress and develop hypotheses for maximizing resistance to it.

In FY93, plans are to: (a) continue research on human communicative processes for spatially-separated but electronically-linked individuals and groups, (b) investigate role of time-of-day factors with respect to irregular work schedules, accidents and human performance error, and task-execution after rapid time-zone change, (c) develop theoretical understanding of personality factors that lead to enhanced job motivation, performance under stress, and performance in irregular work schedules, and (d) explore cultural variables as factors in performance effectiveness of individuals and groups.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) exploring relevant variables and individual-organizational relationships that determine successful decision making and problem solving in hierarchical organizations, with particular attention to crisis situations, (b) determining learning and reasoning principles that are central to such high level activities as formation of complex concepts, automatic performance of high mental workload tasks, and long term skill retention, (c) determining separate and combined effects of personality, motivation, and time-of-day factors on the performance of cognitive tasks, and (d) defining research methods and concepts related to the military sociology of the American soldier, focusing on the non-commissioned officer.

PROGRAM ELEMENT OVERVIEW

PE: 62716A HUMAN FACTORS ENGINEERING TECHNOLOGY

CONGRESSIONAL CATEGORY: HUMAN FACTORS

DoD ORGANIZATION: ARMY

FUNDING: FY92 $ 5.9M (FY93 PRESIDENT'S BUDGET)
FY93 $ 10.6M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to maximize the effectiveness of the soldier in concert with his materiel, in order to survive and prevail on the battlefield.

Specialized laboratory studies and field evaluations are conducted to collect performance data on the capabilities and limitations of soldiers, with particular attention on soldier and equipment interaction. The resulting data are the basis for weapon systems and equipment design standards, guidelines, handbooks, and soldier training requirements to improve equipment operation and maintenance. Application of advancements yield reduced workload, fewer errors, enhanced soldier protection, user acceptance, and allows the soldier to extract the maximum performance from his equipment.

The work in this Program Element is consistent with the resource-constrained Army Technology Base Master Plan and the Science and Technology Objectives (STOs) therein. Supplemental Appropriation in FY92 funds for Operation Desert Storm (ODS) in the amount of $480K are included.

The in-house developing organization responsible for this program is the U.S. Army Human Engineering Laboratory (HEL).

RELATED ACTIVITIES:

This program adheres to tri-Service Reliance Agreements on Conventional Air/Surface Weaponry, Ground Vehicles, and Manpower & Personnel with oversight and coordination provided by the Joint Directors of Laboratories.

Work in this Program Element contains no unwarranted duplication of effort among the Military Departments.

PAYOFF/UTILIZATION:

The payoffs of this Program Element include: a) a completed evaluation of field artillery battlefield decision making, and b) completed Human Factors Engineering Assessments for 55 systems under development.

PROJECT OVERVIEW

		92	93
PROJECT: AH70	HUMAN FACTORS ENGINEERING SYSTEMS DEVELOPMENT	$ 5.9M	$10.6M

PE: 62716A — HUMAN FACTORS ENGINEERING TECHNOLOGY

CONGRESSIONAL CATEGORY: HUMAN FACTORS

DoD ORGANIZATION: ARMY

RESPONSIBLE ORGANIZATION: ARMY HUMAN ENGINEERING LABORATORY

PROJECT SYNOPSIS:

The objectives of this Project are to: (a) generate data on soldier-system interfaces and soldier-system performance, as well as the capabilities and limitations of soldiers, and (b) provide for the application of these data throughout the Army materiel development process.

In FY92, plans include: (a) transitioning to the user and materiel developer human factors engineering design guidelines for air defense command and control and weapon system components, and (b) determining the performance requirements of a four-man main battle tank and, with the aid of new automation technologies, redistributing those performance tasks to a two-man crew.

In FY93, plans include: (a) demonstrating a global positioning system (GPS) fuze concept for artillery registration rounds to improve the effectiveness of artillery fire support, (b) development of an operational prototype of a knowledge-based decision support system for Corps-level baseline and contingency supply distribution and inventory planning, and (c) conducting human factors experimentation in aided target recognition (ATR) and develop a comprehensive human factors database to ensure the soldier-ATR interface is effectively designed.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) conducting field evaluations of new command and control (C2) displays and automated tactical operation center concepts to improve the soldier-command-control-communication (C3) interface in combined arms forward area air defense battlefield situations, (b) continued technology developments of expert systems to determine the feasibility of the knowledge-based logistics planning for tactical ammunition management, (c) completion of an evaluation of field artillery battlefield decision making, and (d) completion of Human Factors Engineering Assessments for 55 systems under development.

PROGRAM ELEMENT OVERVIEW

PE: 62727A NON-SYSTEM TRAINING DEVICE TECHNOLOGY

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: ARMY

FUNDING: FY92 $ 3.5M (FY93 PRESIDENT'S BUDGET)
FY93 $ 8.5M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to provide exploratory development of state-of-the-art generic training methods and equipment to increase overall combat effectiveness while reducing Army training costs.

This program also provides enabling technologies for advancing Distributed Interactive Simulation (DIS) networking capabilities and simulated representations of battlefield environments needed for training active and Reserve component forces in an era of reduced Operating Tempo (OPTEMPO) and range availability.

Arrival of sophisticated, high-technology equipment and their complex relations to each other, coupled with increased constraints on personnel, money, and time in the field training environment, makes this effort critical to the overall success of the Army. As an example, support from this program resulted in a Multiple Integrated Laser Engagement Simulation System (MILES).

The work in this Program Element is consistent with the resource-constrained Army Technology Base Master Plan and the Science and Technology Objectives (STOs) therein, and supports the DoD Science and Technology (S&T) Thrust Area Number 6 for Training and Readiness.

The in-house developing organizations responsible for this program are the Project Manager for Training Devices (PM TRADE), and the Army Research Institute for the Behavioral and Social Sciences (ARI).

RELATED ACTIVITIES:

This program adheres to tri-Service Agreements on Training Systems with oversight and coordination provided by the Training and Personnel Systems S&T Evaluation Management Committee (TAPSTEM).

Work in this Program Element is related to and is fully coordinated with efforts in PE #62308A and contains no unwarrented duplication of effort among the Military Departments.

PAYOFF/UTILIZATION:

The payoff of this Program Element includes: (a) completed National Training Center (NTC) concept exploratory studies to expand from battalion size to brigade size training capability, (b) published initial protocol data unit standards of visual weapons systems for DIS and initiated standard development for next level of systems, and (c) completed thermal target projector efforts with the publication of a final report detailing user and technical evaluations.

PROJECT OVERVIEW

		92	93
PROJECT: A230	NON-SYSTEM TRAINING DEVICES	$ 3.5M	$ 8.5M

PE: 62727A NON-SYSTEM TRAINING DEVICE TECHNOLOGY

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: ARMY

RESPONSIBLE ORGANIZATION: PROJECT MANAGER FOR TRAINING DEVICES

PROJECT SYNOPSIS:

The objective of this Project is to provide for the exploratory development of training devices technology that supports general military training and training on more than one item or system.

This program provides the necessary front-end analytical effort needed to transition suitable developments into full-scale development.

In FY92, plans are to: (a) expand capability and demonstrating Artificial Intelligence (AI) techniques to augment use of computer simulations supporting training at the Combat Training Centers, (b) develop standards for wide-area networking of dissimilar simulators, (c) demonstrate visual system dynamic databases and display technologies, (d) continue development of communication and architecture standards for Distributed Interactive Simulation (DIS), (e) examine methodologies for DIS standards conformance, (f) initiate studies to integrate Semi-Automated Forces (SAFOR) in DIS, (g) continue transition of BDS-D technology to Guard/Reserve and combat training devices, and materiel developers' simulators, (h) demonstrate linkage of dissimilar simulation with the linkage of Patriot Operational Trainer and BDS-D simulators at Ft Rucker, AL, (i) demonstrate visual system dynamic databases and display technologies, (j) demonstrate visual database conversion tools, and (k) initiate implementation/evaluation of modular design principles for simulators.

In FY93, plans are to: (a) enhance simulations of intelligent opposing and adjacent friendly forces to accurately reflect current battlefield doctrine, (b) develop practical, effective approaches for linking different simulation environments together to provide a seamless joining of live field exercises and simulated battles, (c) continue establishment and evaluation of DIS networking standards, (d) increase dynamic battlefield representation thru architecture definition for SAFOR, (e) initiate assessment of DIS to supplement operational field testing and evaluation, (f) demonstrate standard modular architecture for rotocraft simulators, (g) develop application of DIS to support National Guard future training requirements, (h) develop multi-sensory realtime battlefield simulation technology which immerses soldiers in three-dimensional space, (i) continue intelligent SAFOR technology at an accelerated rate of development in support of BDS-D, (j) support conformance testing of DIS standards utilizing North Carolina Consortium, (k) continue investigation of visual system architectures required for dynamic terrain databases.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) completion of National Training Center (NTC) concept exploratory studies to expand from battalion size to brigade size training capability, (b) demonstration of feasibility of improved multiple integrated laser engagement simulation (MILES) laser system to shoot through smokes and obscurants to allow training with operational thermal sights, (c) publishing of initial protocol data unit standards of visual weapons systems for DIS and initiation of standard development for next level of systems, (d) initiation of investigation of applicability of existing and proposed Government Open System Interactive Profile (GOSIP) communications protocols to DIS requirements, (e) demonstration of Artificial Intelligence (AI) application for role player assist for computer battle simulations, (f) initiation of exploration of architectures, standards and modeling to support the Battlefield Distributed Simulation-Development (BDS-D) program which will provide an accredited, warfighter-in-the-loop, realtime, distributed simulation of virtual combined arms battlefield, (g) demonstration of feasibility of semi-automated dismounted infantry for DIS, (h) continued investigation of visual system dynamic databases and display technologies, (i) investigated linkage of PATRIOT Operator Trainer with DI, (j) demonstration of capability of Digital Video Interactive (DVI) multimedia technology to support interactive thermal image combat vehicle identification training, (k) completion of thermal target projector efforts with the publication of a final report detailing user and technical evaluations, and (l) demonstration of an embedded intelligence training system in air-land battle management model.

PROGRAM ELEMENT OVERVIEW

PE: 62785A	MANPOWER, PERSONNEL, AND TRAINING TECHNOLOGY
CONGRESSIONAL CATEGORY:	HUMAN FACTORS SIMULATION & TRAINING DEVICES EDUCATION & TRAINING MANPOWER & PERSONNEL
DoD ORGANIZATION:	ARMY
FUNDING:	FY92 $ 15.9M (FY93 PRESIDENT'S BUDGET) FY93 $ 16.0M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to provide a scientifically sound basis for maximizing soldier and unit performance by empirically determining: (a) how the soldier's workload can be "shifted from the head to the hardware" in the design of new weapon systems, (b) what information must be available to system designers to ensure compatible man-machine systems, (c) what simulator and training device design features are necessary to ensure effective training at minimal cost, (d) how individuals and units acquire and retain complex skills, (e) how to substitute automated, cognitive science-based tutoring technologies for rapidly diminishing individual training resources, and (f) how behavioral science methods can be used to improve the recruiting, selection, and retention of quality soldiers.

The work in this Program Element is consistent with the resource-constrained Army Technology Base Master Plan, and the Science and Technology Objective (STO) therein.

The in-house developing organization responsible for this Program Element is the U.S. Army Research Institute for the Behavioral and Social Sciences.

RELATED ACTIVITIES:

This program adheres to tri-Service Reliance Agreements on Manpower and Personnel and Training systems with oversight and coordination provided by the Joint Directors of Laboratories.

Work in this Program Element contains no unwarranted duplication of effort among the Military Departments.

PAYOFF/UTILIZATION:

The payoff of this Program Element includes providing a scientifically sound technology base for maximizing soldier and unit performance.

PROJECT OVERVIEW

		92	93
PROJECT: A790-ET	HUMAN PERFORMANCE EFFECTIVENESS AND SIMULATION	$ 0.0M	$ 3.3M

PE: 62785A — MANPOWER, PERSONNEL, AND TRAINING TECHNOLOGY

CONGRESSIONAL CATEGORY: EDUCATION & TRAINING

DoD ORGANIZATION: ARMY

RESPONSIBLE ORGANIZATION: ARMY RESEARCH INSTITUTE

PROJECT SYNOPSIS:

The objectives of this Project are to experimentally determine: (a) the most effective means for integrating human decision makers and automated information technology in new Army systems, (b) the relative contribution of manpower, personnel, and training variables to weapon system performance and unit effectiveness, (c) the minimum design features for simulators/training devices that will achieve effective training at the lowest cost, and (d) cognitive science-based technologies for delivering more effective training and job aiding.

The Education and Training portion of this Project transitions from Simulation and Training Devices and represents a new start in FY93.

In FY93, plans include: (a) using simulator testbed, experimentally determine minimum visual fidelity requirements for different pilot tasks for effective flight simulator training, and (b) developing preliminary individual and unit performance assessment methods for use in simulated "virtual reality" environments.

PAYOFF/UTILIZATION:

The Education and Training portion of this Project will experimentally determine the cognitive science-based technologies for delivering more effective training and job aiding.

PROJECT OVERVIEW

		92	93
PROJECT: A790-HF	HUMAN PERFORMANCE EFFECTIVENESS AND SIMULATION	$ 2.8M	$ 2.9M
PE: 62785A	MANPOWER, PERSONNEL, AND TRAINING TECHNOLOGY		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	ARMY RESEARCH INSTITUTE		

PROJECT SYNOPSIS:

The objectives of this Project are to experimentally determine: (a) the most effective means of integrating human decision makers and automated information technology in new Army systems, (b) the relative contributions of manpower, personnel, and training variables to weapon system performance and unit effectiveness, (c) the minimum design features for simulators/training devices that will achieve effective training at the lowest cost, and (d) cognitive, science-based technologies for delivering more effective training and job aiding.

For the Human Factors portion of this Project, FY92 plans are to: (a) experimentally evaluate alternative cognitive (intellectual) learning strategies for language training, (b) develop a behavioral taxonomy to evaluate Military Intelligence (MI) performance and to characterize the complex MI decision-making process, and (c) develop a prototype aviator performance tracking system.

For FY93, plans are to determine the cognitive job-aiding tools required to improve command and control situation assessment skills.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments for the Human Factors portion of this Project included: (a) experimentally determining how crew selection procedures can reduce Army aviation accidents caused by human error, and (b) empirically determining staff skill requirements for the Army Tactical Command and Control System.

PROJECT OVERVIEW

		92	93
PROJECT: A790-ST	HUMAN PERFORMANCE EFFECTIVENESS AND SIMULATION	$ 3.7M	$ 0.0M

PE: 62785A — MANPOWER, PERSONNEL, AND TRAINING TECHNOLOGY

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: ARMY

RESPONSIBLE ORGANIZATION: ARMY RESEARCH INSTITUTE

PROJECT SYNOPSIS:

The objectives of this Project are to experimentally determine: (a) the most effective means for integrating human decision makers and automated information technology in new Army systems, (b) the relative contributions of manpower, personnel, and training variables to weapon system performance and unit effectiveness, (c) the minimum design features for simulators/training devices that will achieve effective training at the lowest cost, and (d) cognitive, science-based technologies for delivering more effective training and job aiding.

For the Simulation and Training Devices portion of this Project, FY92 plans are to: (a) construct a government-owned, contractor-operated facility to house a research simulator testbed to be used to experimentally determine the needed complexity of aviation simulators and training devices, (b) develop experimentally-based rules for determining visual scene contents in low-cost training simulators, and (c) test a preliminary methodology for selecting tasks for training using "virtual reality" simulated environments.

In FY93, the Simulation and Training Devices portion of this Project will transition to Education and Training.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments for the Simulation and Training Devices portion of this Project included the development of: (a) a joint U.S./Canadian flight training simulator testbed, and (b) concepts for training feedback in networked simulators.

PROJECT OVERVIEW

		92	93
PROJECT: A791-ET	MANPOWER, PERSONNEL AND TRAINING	$ 4.0M	$ 4.6M
PE: 62785A	MANPOWER, PERSONNEL, AND TRAINING TECHNOLOGY		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	ARMY RESEARCH INSTITUTE		

PROJECT SYNOPSIS:

The objectives of this Project are to provide the scientific basis for improved: (a) methods for force structure planning, selection, testing, and leader development, (b) methods for estimating manpower levels and soldier skills required by new Army weapon systems, (c) efficiency for training material development, and (d) individual and unit skill learning, retention, and performance on the job.

For the Education and Training portion of this Project, FY92 plans are to: (a) develop a prototype crew-level training program for improving safety within operational aviation units, and (b) design and develop an automated tool for deriving training requirements for collective tasks.

In FY93, plans are to: (a) develop training strategies for sustaining command and control skills, and (b) design a knowledge base for an expert system that will aid training developers in selecting training strategies.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments for the Education and Training portion of this Project included: (a) development of methods for estimating the required frequency of refresher training in units, by type of task, to assure skill retention, and (b) test and refinement of automated test development and training development tools.

PROJECT OVERVIEW

		92	93
PROJECT: A791-MP	MANPOWER, PERSONNEL AND TRAINING	$ 4.0M	$ 3.8M
PE: 62785A	MANPOWER, PERSONNEL, AND TRAINING TECHNOLOGY		
CONGRESSIONAL CATEGORY:	MANPOWER & PERSONNEL		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	ARMY RESEARCH INSTITUTE		

PROJECT SYNOPSIS:

The objectives of this Project are to provide the scientific basis for improved: (a) methods of force structure planning, selection testing, and leader development, (b) methods for estimating manpower levels and soldier skills required by new Army weapon systems, (c) efficiency for training material development, and (d) individual and unit skill learning, retention, and performance on the job.

For the Manpower and Personnel portion of this Project, FY92 plans are to identify variables for predicting performance of low aptitude soldiers and identification of jobs that they can perform most effectively.

In FY93, plans are to: (a) develop a preliminary model of the multiple factors that affect officer career progression in order to enhance officer career management, and (b) develop models that will lead to the most cost-effective utilization of soldiers of various aptitude levels.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments for the Manpower and Personnel portion of this Project included: (a) development of a methodology to generate job performance prediction equations, and (b) validation of a preliminary model for estimating costs of alternative enlisted force structures for different contingency missions.

PROGRAM ELEMENT OVERVIEW

PE: 63003A AVIATION ADVANCED TECHNOLOGY

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: ARMY

FUNDING: FY92 $ 2.9M (FY93 PRESIDENT'S BUDGET)
FY93 $ 2.6M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of the Manpower, Personnel, and Training (MPT) portion of this Program Element is to provide for the integration and demonstration of advanced technology components and subsystems.

Modern Army rotorcraft will be required to support the Army's global mission, and, as such, face an awesome array of air defense threats which include: (a) optically and radar-equipped 23mm and 30mm air defense guns, (b) SA-11, -13, and -14 infrared and radar-guided missiles, and (c) potential nuclear/biological/chemical and laser threats directed and delivered both from the ground and from air vehicles. As a result, the aircraft must possess improved mobility, agility, firepower, and inherent features to include durability and sustainability for extended periods of combat at an affordable cost. Army aircraft must be durable, damage-tolerant, easy to repair and maintain including in a Nuclear, Biological and Chemical (NBC) environment, and possess the highest level of availability possible. The application of fiber-optic technology, advanced powertrain technology, integration of advanced weapons and fire control, advanced simulation technology, artificial intelligence, and advanced avionics for command and control and navigation are the keys to providing reliable, survivable Army aircraft essential to the future integrated battlefield. Emphasis is placed on: (a) application of advanced structures ballistically tolerant material, (b) avionics to enable day/night, adverse weather nap-of-the earth operations, (c) advanced propulsion systems (engine and drive train) and rotors for improved mobility, maneuverability, agility, reduced weight/cost and fuel consumption, (d) advanced flight controls for reduced weight and cost, (e) advanced weapons integration, (f) improved survivability, reliability, and maintainability, and (g) reduced pilot workload/training requirements. In addition, this Program Element standardizes synthetic flight simulator component interfaces to facilitate system growth in terms of full-mission simulation performance. A rapidly configurable database is integrated to provide nap-of-the-earth resolutions for Army pre-mission planning and training. A crew station full-mission simulator demonstrates future aircraft man-machine interaction

and performance. The technology is applicable for the next generation Army aircraft of the mid-to-late 1990s and beyond, as well as for block improvements to existing aircraft.

The work in this Program Element is consistent with the resource-constrained Army Technology Base Master Plan (ATBMP) and the Army Aviation Modernization Plan; addresses Science and Technology Objectives (STOs) milestones in the ATBMP; and supports the DoD Science and Technology Thrust for Precision Strike.

The in-house organizations responsible for this program are Project Manager for Training Devices (PM TRADE); U.S. Army Aviation Systems Command (AVSCOM); Avionics R&D Activity; Aerostructures Directorate, NASA Langley Research Center; Aeroflightdynamics Directorate, NASA Ames Research Center; Propulsion Directorate, NASA Lewis Research Center; and Aviation Applied Technology Directorate. Related activities are performed by the National Aeronautics and Space Administration (NASA).

RELATED ACTIVITIES:

This program adheres to tri-Service Reliance Agreements on Aeropropulsion and Air Vehicles (Rotary) with oversight and coordination provided by the Joint Directors of Laboratories. Related concept exploration is conducted under PE 0602211A, PE 0604801A and PE 0604270A.

As part of our total coordination, the Army participates on and with the following groups, organizations, and programs: the Department of Defense tri-Service Joint Technical Coordination Group for Munitions Development and Aircraft Survivability; Acoustical Society of American Standards, Committee on Acoustics Group for Aerospace Research and Development; the NATO Military Agency for Standardization Air Armament Working Party; Aircraft Instruments and Aircrew Stations Working Group; the Joint Integrated Avionics Working Group (JIAWG); Integrated High-Performance Turbine Engine Technology (IHPTET) Steering Committee; the Air Armament Working Party of NATO; and the Executive Steering Committee for the RPA ATTD Program. This participation enables the gathering of technical information and assets in determining the joint use and standardization of airborne weaponization items. The Army Munitions Research and Development Committee, within the Office of the Secretary of Defense, functions to establish joint-Service requirements and the development of air munitions.

There is no unnecessary duplication of effort within the Army or Department of Defense.

PAYOFF/UTILIZATION:

The payoffs of this Program Element include improved rotorcraft mobility, agility, firepower, and inherent features to include durability and sustainability for extended periods of combat at an affordable cost.

Army rotorcraft will be durable, damage-tolerant, easy to repair and maintain, and possess the highest level of availability possible.

PROJECT OVERVIEW

		92	93
PROJECT: DB39	FLIGHT SIMULATOR COMPONENTS	$ 2.9M	$ 2.6M

PE: 63003A — AVIATION ADVANCED TECHNOLOGY

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: ARMY

RESPONSIBLE ORGANIZATION: PROJECT MANAGER FOR TRAINING DEVICES

PROJECT SYNOPSIS:

The objective of this Project is to develop and demonstrate advanced flight simulation techniques and components for incorporation into the design of future simulators and for improving training capabilities of current simulators.

These future simulators and capabilities will aid in the evaluation of force effectiveness and new weapon systems concepts in the context of a free-play, simulated combined arms battlefield environment. In addition, this simulation capability will be used for demonstrating and assessing advancements in distributed large-scale, networked real-time, man-in-the-loop, upward-compatible simulation architectures, and emerging tri-Service/industry standards and methods, for representing battlefield behaviors through the use of selective levels of simulation fidelity and networks participation.

In FY92, plans include: (a) completing an exemplar photographic database for mission planning and rehearsal, (b) developing cost/labor reduction capabilities to optimize database development, (c) increasing battlefield representation capability, (d) defining the architecture and implementing methods for Semi-Automated Forces (SAFOR) capability in follow-on simulated battlefields, and (e) initiating the Battlefield Distributed Simulation-Developmental (BDS-D) Advanced Technology Transition Demonstration (ATTD).

In FY93, plans include: (a) demonstrating a standard modular architecture for rotorcraft simulators to enhance reuse of standard components and reduce recurring development costs, (b) continuing the establishment/evaluation of networking standards, (c) demonstrating first phase expanded battlefield simulation and site-to-site linkage between Crew Station Research and Development Facility (CSRDF) and BDS-D, Ft. Rucker site, and (d) assessing the ability of the BDS-D environment to supplement operational field testing.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included the demonstration of Ada computer language for real-time, man-in-the-loop flight simulators.

PROGRAM ELEMENT OVERVIEW

PE: 63007A — HUMAN FACTORS, PERSONNEL AND TRAINING ADVANCED TECHNOLOGY

CONGRESSIONAL CATEGORY:
MANPOWER & PERSONNEL
HUMAN FACTORS
EDUCATION & TRAINING
SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: ARMY

FUNDING:
FY92 $ 15.7M (FY93 PRESIDENT'S BUDGET)
FY93 $ 16.9M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objectives of this Program Element are to develop and demonstrate "people" technologies that include: (a) theory-based individual and collective (unit) training strategies, (b) design strategies for lower cost, less complex simulators that still achieve training objectives, (c) improved methods for recruiting, selecting, and retaining quality soldiers, and (d) human factors/soldier-machine interface design alternatives to ensure total system operational effectiveness.

This is the Army's advanced development program in Soldier-Oriented R&D in personnel performance, training, and human factors engineering. Personnel and personnel-related costs account for more than 60% of the Army's budget. With major reductions in the Army force structure, it is critical that the Army assure that (a) high quality soldiers are assigned to the job that best utilizes his/her abilities, (b) individuals and units are fully trained to execute their missions, and (c) human performance in systems is maximized.

The work in this Program Element is consistent with the resource-constrained Army Technology Base Master Plan and the Science and Technology Objectives (STOs) therein.

The reduction in FY92/93 results from an OSD-recommended zero-sum transfer to a management and support (6.5) program, PE 0605803, Project D730.

During FY92, funds were reprogrammed from Project A795 to Project A794 to reflect the fact that efforts under the PE are concerned mostly with the development of training strategies leading to the cost-effective utilization of training resources and less with the design of simulator and training device hardware and software. FY93 funding has been adjusted to reflect this change.

The in-house developing organization responsible for Projects A792, A793, A794, and A795 is the Army Research Institute for the Behavioral and Social Sciences (ARI), and for Project A796 is the US Army Laboratory Command (LABCOM) Army Human Engineering Laboratory (HEL).

RELATED ACTIVITIES:

This program adheres to tri-Service Reliance agreements on Manpower & Personnel and Training Systems with oversight and coordination provided by the Joint Directors of Laboratories.

Work in this Program Element contains no unwarranted duplication of effort among the Military Departments.

PAYOFF/UTILIZATION:

The payoffs of this Program Element include: (a) development and validation of the Life Cycle Army Manpower Cost Model for manpower costing for weapon systems, (b) development of an empirical method for making cost-benefit trade-offs among performance requirements, personnel availability, training requirements, and equipment design, (c) development of methods for use by TRADOC to derive "Lessons Learned" from JRTC data, (d) development of strategies for applying expert systems-based instruction to maintenance skills training, and (e) enhanced HFE systems to include the MANPRINT domains of manpower, personnel, training, health hazards, and safety; and coordinated application with Navy and Air Force human factors elements.

PROJECT OVERVIEW

		92	93
PROJECT: A792	MANPOWER AND PERSONNEL	$ 3.8M	$ 4.2M
PE: 63007A	HUMAN FACTORS, PERSONNEL AND TRAINING ADVANCED TECHNOLOGY		
CONGRESSIONAL CATEGORY:	MANPOWER & PERSONNEL		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	ARMY RESEARCH INSTITUTE		

PROJECT SYNOPSIS:

The objectives of this Project include developing and evaluating technology for improved methods of: (a) attracting personnel, (b) selecting the most qualified, (c) assigning them to Military Occupational Specialties (MOS) that capitalize on their aptitudes and vocational interests, and (d) retaining the best performers.

This Project also includes major research and development (R&D) efforts to quantify the effect of family factors on readiness and retention, and build a technology for the development of executive-level Army leaders.

In FY92, plans include: (a) evaluating the contribution of psychomotor and spatial tests to computerized selection and classification, (b) validating an optimal selection and classification battery for predicting first tour performance, (c) developing and testing a new methodology for selecting Ranger and Special Forces candidates, and (d) developing a methodology for identifying needs for additional or replacement selection and classification tests to support changes in Army Military Occupational Specialties (MOSs).

In FY93, plans include: (a) empirically testing the role of Army community support programs in retaining high performance soldiers, (b) developing preliminary versions of new methods for qualifying soldiers for promotion and reenlistment, (c) initiating field test of a totally restructured selection and classification system for all enlisted personnel, and (d) developing and testing new methodology for improving selection to the U.S. Military Academy.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) development and validation of the Life Cycle Army Manpower Cost Model for manpower costing for weapon systems, (b) empirical identification of psychosocial and demographic variables that best predict retention of high quality officer and enlisted personnel, (c) conducting small-scale field test of alternative selection and classification system, and (d) validation of paper-and-pencil tests for predicting successful completion of the JFK Special Warfare Center and Qualifications Course.

PROJECT OVERVIEW

		92	93
PROJECT: A793	HUMAN FACTORS IN TRAINING AND OPERATIONAL EFFECTIVENESS	$ 6.6M	$ 6.5M
PE: 63007A	HUMAN FACTORS, PERSONNEL AND TRAINING ADVANCED TECHNOLOGY		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	ARMY RESEARCH INSTITUTE		

PROJECT SYNOPSIS:

The objectives of this Project are to develop and evaluate: (a) improved methods for estimating Human Factors, Manpower, Personnel, and Training (HMPT) requirements early in the combat development and weapon system design phases, (b) improved, empirically-based methods for assessing the impact of HMPT variables on weapon system operability and maintainability, and (c) prototype technologies for integrating soldier performance considerations into complex, information-based weapon systems and Command, Control, Communications, and Intelligence (C3I) systems.

The soldier must be systematically considered throughout the weapon system development and acquisition process.

In FY92, plans include: (a) developing a behavioral model for determining future Military Intelligence manpower, personnel, and training requirements, and (b) determining the factors which affect the reliability of information flow and decision making in field artillery systems.

In FY93, plans include: (a) completing development of the HARDMAN III system, a computer-based system that allows prediction of MPT interactions with costs and performance at the weapon, unit, and force levels, (b) developing a model to predict the consequences on intelligence production of changing MPT requirements, (c) developing a model for predicting the impact of variations in staff size on command and control performance, (d) developing techniques for performing tradeoff analyses to assist the Military Occupational Specialty restructuring process, and (e) developing a comprehensive behavioral database of aviation maintainer attributes and abilities for use by systems designers.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) development of an empirical method for making cost-benefit trade-offs among performance requirements, personnel availability, training requirements, and equipment design, (b) determined validity of operator/maintainer workload predictors for artillery, air defense, and target handoff systems, (c) evaluation of impact on personnel and training of different maintenance concepts for field artillery and non-line-of-sight components of air defense systems, (d) development of empirically-based Manpower and Personnel Integration (MANPRINT) methods for improved analyses of reliability, availability and maintainability, battle-damage assessment, and accident prevention, (e) development of a field artillery automated battle simulation facility, (f) development of a field training exercise (FTX) "lessons learned" database for the Battle Command Training Program, and (g) determination of quantitative relationships among weapon system design characteristics, personnel performance, and unit performance effectiveness.

PROJECT OVERVIEW

		92	93
PROJECT: A794	EDUCATION AND TRAINING	$ 2.8M	$ 5.3M
PE: 63007A	HUMAN FACTORS, PERSONNEL AND TRAINING ADVANCED TECHNOLOGY		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	ARMY RESEARCH INSTITUTE		

PROJECT SYNOPSIS:

The objective of this Project is to lead to theory-based training strategies, prescriptions for cost-effective allocation of training resources, that produce proficient soldiers and units with a decrease in training resources (personnel, time, facilities, and travel).

This Project will experimentally investigate alternative, cost-effective applications of electronic technology and cognitive (intellectual) learning technology for training of individual combat, technical, and maintenance skills.

In FY92, plans include: (a) determining the effectiveness of home station innovations by assessing their impact on CTC performance, (b) developing and testing alternative training strategies for Reserve Component combat skills, (c) developing prototype unit training strategies incorporating various combinations of networked combined arms simulations and field training at CTCs, (d) developing tank gunnery training strategies involving elements of simulation, live fire, and individual soldier part-task training, and (e) developing prototype computer-based decision aids for advanced communications equipment operators and maintainers.

In FY93, plans include: (a) evaluating and refining prototype unit training strategies, (b) developing prototype unit methods to improve training for communication of the commander's intent, and casualty management for the light forces, (c) refining a prototype unit performance feedback system for use at CTCs, (d) developing a prototype automated classroom for maintenance training, and (e) developing a methodology and guidelines for designers of simulators and training devices to perform improved cost and training-effectiveness design trade-off analyses.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) development of methods for use by the Army Training and Doctrine Command (TRADOC) to derive "Lessons Learned" from Joint Readiness Training Center (JRTC) data, (b) empirical determination of the relationship of home station training, leadership, and cohesion, to improve unit performance in realistic simulated combat exercises at Combat Training Centers (CTCs), (c) development of techniques to objectively measure unit performance at the JRTC, (d) development of procedures for improving National Training Center after-action reports and take-home unit training based on collective (unit) training theory, and (e) empirical testing of prototype tank gunnery training strategies, incorporating crew and platoon training devices to maximize training effectiveness.

PROJECT OVERVIEW

		92	93
PROJECT: A795	TRAINING SIMULATION	$ 1.4M	$ 0.0M
PE: 63007A	HUMAN FACTORS, PERSONNEL AND TRAINING ADVANCED TECHNOLOGY		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	ARMY RESEARCH INSTITUTE		

PROJECT SYNOPSIS:

The objective of this Project is to provide the United States Army Training and Doctrine Command (TRADOC) and the Project Manager for Training Devices (PM TRADE) with scientifically-based recommendations for the design of lower-cost, lower-complexity simulators and training devices, focusing on aviation and armor.

The need for effective simulators and training devices in aviation and armor units is increasing in order to avoid the high cost of using actual equipment for training while still enabling the Army to "train as it will fight."

In FY92, plans include transition of funds from this Project to Project A794, this Program Element.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) development of strategies for applying expert systems-based instruction to maintenance skills training, and (b) development of strategies for conducting soldier-in-the-loop simulations with NATO allies.

PROJECT OVERVIEW

		92	93
PROJECT: A796	HUMAN FACTORS ENGINEERING IN SYSTEMS DESIGN	$ 1.0M	$ 1.0M
PE: 63007A	HUMAN FACTORS, PERSONNEL AND TRAINING ADVANCED TECHNOLOGY		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	ARMY HUMAN ENGINEERING LABORATORY		

PROJECT SYNOPSIS:

The objective of this Project is to develop methods, models, analysis tools, techniques, design guidelines, and non-system-specific technology demonstrators for Human Factors Engineering (HFE) integration throughout the combat development and weapon system design process.

Rapid changes in technology, combined with increased emphasis on the soldier-machine interface, have resulted in increasing demands for HFE expertise and the transfer of the technology into the materiel development and acquisition process.

In FY92, plans include: (a) continuing efforts to expand expert system applications to include all domains of MANPRINT, tri-Service coordination, and demonstrations in all Army systems under development, and (b) adding torso rotation function, and standing mobility to the man-model and demonstrate/validate model in Line-of-Sight Anti-tank (LOSAT), USMC Advanced Amphibious Assault Vehicle (AAAV) and Bradley Fighting Vehicle Hatch design.

In FY93, plans include: (a) completing development, validation, and demonstration of first and second generation HFE knowledge-based/expert system/integrated decision aids, and transition to HF engineers in the field, and (b) completing software development to add motion (walking), enhanced strength, reach, and facial animation; transition the model to several materiel developers for use with their computer-aided design (CAD) systems.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) refined expert system development and expansion of the application of the HFE knowledge-based system to other Army materiel development programs, (b) enhancement of the HFE system to include the MANPRINT domains of manpower, personnel, training, health hazards, and safety; and coordinated application with Navy and Air Force human factors elements, and (c) addition of joint motion and strength to the man-model for use in evaluating the soldier-machine interface in CAD.

PROGRAM ELEMENT OVERVIEW

PE: 64715A	NON-SYSTEM TRAINING DEVICES - ENGINEERING DEVELOPMENT
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES
DoD ORGANIZATION:	ARMY
FUNDING:	FY92 $ 61.1M (FY93 PRESIDENT'S BUDGET) FY93 $ 42.6M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to provide for engineering development of Non-System Training Devices to support force-on-force training at Combat Training Centers (CTC), general military training, and training on more than one item/system, as compared with system devices that are developed in support of a specific item/system.

Modern weapon systems are being integrated into the force at unprecedented rates, and the Army is faced with increased constraints on people, dollars, time, and real estate in a training environment where ammunition and fuel costs continue to rise. Training devices and training simulation provide force multipliers that can improve combat effectiveness by providing realistic training scenarios while helping to control rapidly escalating costs. Maintaining the combat effectiveness of Army personnel is the key to maintaining a ready force. This combat effectiveness can best be achieved by innovative, efficient, and results-oriented training. The major thrust in development of new training devices is to maximize the transfer of knowledge, skills, and experience from the training situation to a combat situation. Improved training devices, available through modern technology, must continue to be developed to provide the training required to prepare U.S. soldiers to fight and defeat a numerically superior adversary.

Beginning in FY92, development of Combat Training Center (CTC)-unique training devices, simulators, simulations, and instrumentation was transferred into this Program Elementfrom TRADOC PE 665603, Project M992. Force-on-force training at the National Training Center (NTC), Ft. Irwin, CA, the Joint Readiness Training Center (JRTC), Ft. Chaffee, AR, and the Combat Maneuver Training Center (CMTC), Hohenfels, West Germany, will provide increased combat readiness through realistic collective training in low-, mid-, and high-intensity scenarios.

Project D241, Non-System Training Devices - Combined Arms, develops devices for Army-wide use, including the CTCs. Project D573, Project Manager for Training Devices (PM TRADE)/Naval Training Systems Center (NTSC) Support, provides for in-house salaries and support of PM TRADE and NTSC personnel. Project D574, Combined Arms Tactical Trainer (CATT), projects a family of devices based on the Simulation Networking (SIMNET) concept, including the Close Combat Tactical Trainer (CCTT).

The in-house organizations responsible for this program are the Project Manager for Training Devices and the Naval Training System Center.

RELATED ACTIVITIES:

PE #0605603A (Army User Test Instrumentation and Threat Simulators), PE #0602727A (Non-System Training Device Technology), PE #0604801A (Aviation - Engineering Development), and PE #0604321A (All Source Analysis System).

To preclude duplication of effort, this project is closely coordinated with other Services through Training and Personnel Technology Conferences, a Joint Service Technical Coordinating Group, worldwide staffing of Training Device Requirements, and collocation of PM TRADE with NTSC and the Defense Training and Performance Data Center (TPDC) in Orlando, FL.

There is no unnecessary duplication of effort within the Army or the Department of Defense.

PAYOFF/UTILIZATION:

The payoffs of this Program Element include engineering development efforts for a variety of training devices and battle simulation systems which will provide realistic, effective, and economical training in marksmanship, gunnery, air defense, and Nuclear, Biological, and Chemical (NBC) warfare.

PROJECT OVERVIEW

		92	93
PROJECT: D241	NON-SYSTEM TRAINING DEVICES COMBINED ARMS	$28.3M	$17.9M
PE: 64715A	NON-SYSTEM TRAINING DEVICES - ENGINEERING DEVELOPMENT		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	PROJECT MANAGER FOR TRAINING DEVICES		

PROJECT SYNOPSIS:

The objective of this Project is to develop prototype training devices to support combined arms (infantry, armor, aviation, air defense, artillery, engineer, chemical, and support troops) training and multisystem training within the Army, including the Reserve Components.

The purpose of this Project is to improve the effectiveness and efficiency of Army training. This is done by developing training devices which transfer to trainees the knowledge, ability, and experience required to fight outnumbered and win on the modern battlefield (e.g., the Corps Battle Simulation is a command and control system used to train corps commanders, major subordinate commanders, and major subordinate elements in the conduct of deep operations/air-land battle operations; and Simulated Area Weapons Effects for artillery, munitions, mortars, mines, and nonpersistent chemical agents, which provides a tactical engagement interface with the Multiple Integrated Laser Engagement Simulation (MILES), and individual and unit training in force-on-force exercises). Additionally, this Project provides for the development of maintenance simulators for many Army weapon systems.

Beginning in FY92, Project M992 funding was transferred from TRADOC, and now this Project funds the development of training devices, simulators, simulations and instrumentation for the Combat Training Centers, including the Battle Command Training Program. Included are computer simulations, instrumentation upgrades, and simulation enhancement supporting the Battle Command Training Program (BCTP).

Devices developed under this Project will enable the Army to train the collective unit to obtain the synergistic results which occur when a unit's weapons and support systems are employed in their respective battlefield roles. Utilizing modern technology, these devices and simulations will enhance training effectiveness while minimizing the requirements for scarce resources.

In FY92, plans include: (a) transfer of funding to Project D241 in FY92/93 from PE 0605603/993 (NTC RDMS upgrade Range Data Management System, AH-64 Inst. System) for the continued development of devices, simulators, and simulations to support the National Training Center, the Joint Readiness Training Center, and the Combat Maneuver Training Complex; (b) completed development of the Air Ground Engagement System (AGES II) for the AH-64 and the Armed OH-58; (c) completion of CBS 1.3R for Reforger 92; (d) continued development of CBS 1.4 (includes $2.9M Congressional plus-up); and (e) initial development of the Combat Service Support Training Simulation System.

In FY93, plans include: (a) continued development of devices, simulators, and simulations to support training at the National Training Center, the Joint Readiness Training Center, and the Combat Maneuver Training Complex; (b) completed development of CBS 1.4, and initial development of War Simulation (WARSIM) 2000, Next Generation Battle Simulation; (c) continued development of the Combat Service Support Training Simulation System, and (d) initial development of JRTC Objective Instructural System.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) completed development of the Guard Unit Armory Device for Full Crew Interactive Simulation-Artillery (GUARDFIST I); (b) initial development of the AGES II for the AH-64B; (c) continued development of the Simulated Area Weapons Effects for the Indirect Fire - Global Positioning System at the Combat Training Centers; and (d) completed development of the interim Corps Battle System (CBS) Deep Battle Integration Training (1.3), and initial development of CBS versions 1.3R (Reforger) and CBS 1.4.

PROJECT OVERVIEW

		92	93
PROJECT: D573	PROJECT MANAGER FOR TRAINING DEVICES AND NAVAL TRAINING SYSTEMS CENTER SUPPORT	$ 9.2M	$ 9.2M

PE: 64715A — NON-SYSTEM TRAINING DEVICES - ENGINEERING DEVELOPMENT

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: ARMY

RESPONSIBLE ORGANIZATION: PROJECT MANAGER FOR TRAINING DEVICES

PROJECT SYNOPSIS:

The objective of this Project is to fund the support of the Project Manager for Training Devices (PM TRADE) personnel, and to fund a proportionate Army share of the operating costs of the Naval Training Systems Center (NTSC) through an Inter-Service Support Agreement which is reviewed annually.

In FY92/93, plans include continuing funding PM TRADE personnel and NTSC support.

PAYOFF/UTILIZATION:

In FY91, accomplishments included funding support of PM TRADE personnel and a proportionate Army share of the operating costs of NTSC.

PROJECT OVERVIEW

		92	93
PROJECT: D574	COMBINED ARMS TACTICAL TRAINER (CATT)	$23.7M	$15.5M
PE: 64715A	NON-SYSTEM TRAINING DEVICES - ENGINEERING DEVELOPMENT		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	ARMY		
RESPONSIBLE ORGANIZATION:	PROJECT MANAGER FOR TRAINING DEVICES		

PROJECT SYNOPSIS:

The objective of this Project is to develop a series of trainers based on the Combined Arms Tactical Trainer (CATT) concept which envisions a training environment where all of the elements of the combined arms battlefield can be simulated and exercised at one time. The simulated environment selectively emulates equipment capabilities and establishes an environment which gives maneuver forces the opportunity to practice the art of synchronizing all applications of combat power without regard for peacetime restrictions of environment, economics or safety. It further envisions a training strategy in which units can conduct training at the home station between field exercises.

The Army will not procure a family of stand-alone trainers based on proponent requirements. The common element will be interoperability on the network and database. Thus, helicopter modules at Fort Rucker will be able to operate, via long-haul network, with tank and Bradley modules at Fort Knox or Grafenwoehr. These trainers will allow soldiers to practice, repetitively, techniques which, if performed on real equipment, would be too hazardous, time-consuming, and expensive. These trainers enhance training realism and allow soldiers and units to learn tactical combat lessons on maneuver, command and control, and how to shoot without being killed, lessons heretofore learned only at the cost of soldiers' lives.

The first two trainers in the CATT series are the Close Combat Tactical Trainer (CCTT) and the Aviation Combined Arms Tactical Trainer (AVCATT). Others will be added as proponents define their requirements.

In FY92, plans include: (a) awarding of the engineering and manufacturing contract for CCTT; and (b) release RFP, and conducting source selection activities.

In FY93, plans include continued development of CCTT.

PAYOFF/UTILIZATION:

In FY91, accomplishments included completion of successful ASARC for MDR I/II.

PROGRAM ELEMENT OVERVIEW

PE: 64801A AVIATION-ENGINEERING DEVELOPMENT

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: ARMY

FUNDING: FY92 $ 2.9M (FY93 PRESIDENT'S BUDGET)
FY93 $ 6.7M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to fund engineering development of programs associated with Synthetic Flight Training Systems (SFTS), Aviation Life Support Equipment (ALSE), and Aviation Non-Systems Training Devices.

SFTS (Project D275) supports development of a family of high-fidelity flight, weapon, and mission helicopter simulators to support initial-entry helicopter pilot training, transition training, and combat operational training.

ALSE (Project DC45) makes battlefield survivability possible, and enhances the air crew's ability to return to fight again through new protective clothing ensembles, aviator protective masks laser-protective visors, survival kits, restraint systems, integrated flight helmets, and microclimate cooling devices.

Aviation Non-System Training Devices (Project DE70) supports development of generic rotary-wing aircraft (RWA) that are applicable to more than one aviation system. Aviation network (AIRNET), the DARPA proof-of-principle project, has been succeded bythe aviation test bed (AVTB), a simulator system that supports realistic force-on-force combat training.

The in-house organizations responsible for this program are the Project Manager for Training Devices (PM TRADE) and the Naval Training Systems Center (NTSC), Orlando, FL.

RELATED ACTIVITIES:

ALSE programs are coordinated through several tri-Service and allied working groups and steering committees; appropriate Army, Air Force, and Navy development commands; and aircraft Program Managers (PMs) in order to prevent duplication of effort and ensure proper priority of efforts. For coordination of training device technology with the Air Force and the Navy, PM TRADE is located at NTSC and has an Air Force liaison officer. Program Elements 0603003A (Aviation Advanced Technology) and 0602727A (Non-System Training Devices Technology) perform flight simulation component research and development. Many joint projects are effected between the Services to prevent duplication of in-flight simulator development efforts.

PAYOFF/UTILIZATION:

The payoffs of the Training portion of this Program Element include: (a) reprogrammed funds to support the Air-Ground Engagement System (AGES) II for AH-64, and (b) continued full-scale engineering development of AIRNET under Advance Distributed Simulator Training (ADST) for two reconfigurable rotary-wing aircraft (RWA) devices.

The simulators are used to complement the training accomplished in actual aircraft during formal courses of instruction and for maintenance of combat readiness by rated aviators.

PROJECT OVERVIEW

		92	93
PROJECT: D275	SYNTHETIC FLIGHT TRAINING SYSTEM	$ 0.0M	$ 6.7M

PE: 64801A AVIATION-ENGINEERING DEVELOPMENT

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: ARMY

RESPONSIBLE ORGANIZATION: PROJECT MANAGER FOR TRAINING DEVICES

PROJECT SYNOPSIS:

The objective of this Project is to support development of a family of high-fidelity flight, weapon, and mission helicopter simulators to support initial-entry helicopter pilot training, transition training, and combat operational training.

In FY92, this Project is not funded.

In FY93, plans include initial development of Apache AH-64 integrated crew sustainment trainer (ICST), a transportable, reduced-fidelity version of the AH-64 combat mission simulator (CMS).

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included the reprogramming of funds to support the Air-Ground Engagement System (AGES) II for AH-64.

PROJECT OVERVIEW

		92	93
PROJECT: DE70	AVIATION NON-SYSTEM TRAINING DEVICES	$ 2.9M	$ 0.0M

PE: 64801A — AVIATION-ENGINEERING DEVELOPMENT

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: ARMY

RESPONSIBLE ORGANIZATION: PROJECT MANAGER FOR TRAINING DEVICES

PROJECT SYNOPSIS:

The objective of this Project is to develop generic rotary-wing aircraft (RWA) devices that are applicable to more than one aviation system (i.e., AH-1, AH-64, RAH-66, etc.).

Development of the Aviation Network (AIRNET) project was to be completed in FY92. AIRNET was the Defense Advanced Research Projects Agency (DARPA) "proof-of-principle" project which was transitioned to the Army in March, 1990. AIRNET was a viable developmental tool and test vehicle which provided the means to explore and emulate new and desired systems, or evaluate and adapt current and future doctrine to meet an ever-changing threat environment. AIRNET has been replaced by the aviation test bed (AVTB) simulator system that supports realistic force-on-force combat development and training. Currently available resources do not enable the combat developer and trainer to examine present and future requirements in a combined-arms environment. RWA devices at the AVTB will provide this capability for scout and attack modules in a realistic, stressful, simulated tactical aviation environment.

In FY92, plans include continued development of AIRNET/AVTB with reconfigurable modules.

In FY93, this Project is not funded.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included continued full-scale engineering development of AIRNET under Advance Distributed Simulator Training (ADST) for two reconfigurable rotary-wing aircraft (RWA) devices.

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III-A-1: LISTING OF ARMY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
61102A						DEFENSE RESEARCH SCIENCES
B74A	HEL	2.449	3.212	HF	4	HUMAN ENGINEERING
B74F-ET	ARI	1.706	1.979	ET	3	PERSONNEL PERFORMANCE AND TRAINING
B74F-HF	ARI	0.478	0.831	HF	4	PERSONNEL PERFORMANCE AND TRAINING
B74F-MP	ARI	1.229	1.544	MP	4B	PERSONNEL PERFORMANCE AND TRAINING
		5.863	7.567	TOTAL IN PE		

TOTAL FUNDING IN PROGRAM ELEMENT 61102A :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	5.862	7.566

(CONTINUED)

(CONTINUATION)

III-A-1: LISTING OF ARMY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
62716A						HUMAN FACTORS ENGINEERING TECHNOLOGY
AH70	HEL	5.852	10.568	HF	4	HUMAN FACTORS ENGINEERING SYSTEMS DEVELOPMENT
		5.853	10.568			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 62716A :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	5.852	10.568

(CONTINUED)

(CONTINUATION)

III-A-1: LISTING OF ARMY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
62727A						NON-SYSTEM TRAINING DEVICE TECHNOLOGY
A230	PMTRADE	3.500	8.483	ST	6	NON-SYSTEM TRAINING DEVICES
		3.500	8.483			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 62727A :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	3.500	8.483

(CONTINUED)

(CONTINUATION)

III-A-1: LISTING OF ARMY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
62785A						MANPOWER, PERSONNEL, AND TRAINING TECHNOLOGY
A790-ET	ARI	0.000	3.263	ET	6	HUMAN PERFORMANCE EFFECTIVENESS AND SIMULATION
A790-HF	ARI	2.807	2.894	HF	4	HUMAN PERFORMANCE EFFECTIVENESS AND SIMULATION
A790-ST	ARI	3.647	0.000	ST	6	HUMAN PERFORMANCE EFFECTIVENESS AND SIMULATION
A791-ET	ARI	4.029	4.640	ET	6	MANPOWER, PERSONNEL AND TRAINING
A791-HF	ARI	1.404	1.383	HF	6	MANPOWER, PERSONNEL AND TRAINING
A791-MP	ARI	3.983	3.786	MP	2	MANPOWER, PERSONNEL AND TRAINING
		15.871	15.967			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 62785A :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	15.870	15.966

(CONTINUED)

(CONTINUATION)

III-A-1: LISTING OF ARMY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
63003A						AVIATION ADVANCED TECHNOLOGY
DB39	PMTRADE	2.888	2.561	ST	6	FLIGHT SIMULATOR COMPONENTS
		2.888	2.562			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 63003A :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	2.888	2.561

(CONTINUED)

(CONTINUATION)

III-A-1: LISTING OF ARMY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
63007A						HUMAN FACTORS, PERSONNEL AND TRAINING ADVANCED TECHNOLOGY
A792	ARI	3.813	4.154	MP	2	MANPOWER AND PERSONNEL
A793	ARI	6.631	6.480	HF	4	HUMAN FACTORS IN TRAINING AND OPERATIONAL EFFECTIVENESS
A794	ARI	2.838	5.280	ET	6	EDUCATION AND TRAINING
A795	ARI	1.387	0.000	ST	6	TRAINING SIMULATION
A796	HEL	1.003	0.986	HF	4	HUMAN FACTORS ENGINEERING IN SYSTEMS DESIGN
		15.673	16.900			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 63007A :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	15.672	16.900

(CONTINUED)

(CONTINUATION)

III-A-1: LISTING OF ARMY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
64715A						NON-SYSTEM TRAINING DEVICES - ENGINEERING DEVELOPMEN
D241	PM TRADE	28.258	17.930	ST	6	NON-SYSTEM TRAINING DEVICES COMBINED ARMS
D573	PM TRADE	9.179	9.160	ST	6B	PROJECT MANAGER FOR TRAINING DEVICES AND NAVAL TRAINING SYSTEMS CENTER SUPPORT
D574	PM TRADE	23.649	15.461	ST	6F	COMBINED ARMS TACTICAL TRAINER (CATT)
		61.087	42.552			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 64715A :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	61.086	42.551

(CONTINUED)

(CONTINUATION)

III-A-1: LISTING OF ARMY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
64801A						AVIATION-ENGINEERING DEVELOPMENT
D275	PM TRADE	0.000	6.701	ST	6D	SYNTHETIC FLIGHT TRAINING SYSTEM
DE70	PM TRADE	2.889	0.000	ST	6D	AVIATION NON-SYSTEM TRAINING DEVICES
		2.889	6.702			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 64801A :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	2.889	6.701

III.B. NAVY PROGRAM ELEMENT AND PROJECT SYNOPSES

PROGRAM ELEMENT OVERVIEW

PE: 61153N	DEFENSE RESEARCH SCIENCES, SUBELEMENT 42: COGNITIVE AND NEURAL SCIENCES
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING HUMAN FACTORS MANPOWER & PERSONNEL
DoD ORGANIZATION:	NAVY
FUNDING:	FY92 $ 11.3M (FY93 PRESIDENT'S BUDGET) FY93 $ 13.4M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to sustain U.S. Naval scientific and technological superiority for the maintenance of naval power and national security.

The program includes theoretical and experimental research in selected areas of the physical, mathematical, engineering, environmental, behavioral and life sciences.

The objective of the MPT Subelement is to develop fundamental knowledge about human capabilities and characteristics, which support and guide Navy and Marine Corps efforts to improve: (a) personnel selection and classification, (b) training, (c) equipment design for ease of human use and maintenance, (d) team composition, (e) leadership, and (f) group decision-making procedures.

Major areas are: (a) Personnel and Training, which includes research on: (1) psychological measurement for selection, classification, and training, (2) human learning and instructional processes, and (3) the cognitive and neural bases of skill and knowledge acquisition, (b) Engineering Psychology, which covers research on basic human performance (such as inference, judgment, decision-making, auditory and visual perception, and system control) and on factors underlying the design of human-compatible interfaces in high technology systems, and (c) Group Psychology, which focuses on group processes, group behavior, leadership, and other factors that determine the productivity, morale, and retention of personnel. Research approaches include theoretical formulations, laboratory and simulator experimentation, mathematical modeling, correlational analyses, and observation and measurement in operational settings.

This Program continues to support: (a) the ONR Graduate Fellowship Program, (b) the ONR High School Apprenticeship Program, (c) the Historically Black Colleges/Universities Program, (d) programs designed to increase scientific manpower trained in areas critical to Naval research, and (e) the Summer Faculty Program, which brings academic scientists into Navy laboratories to better couple Navy laboratory and university research.

RELATED ACTIVITIES:

This program adheres to tri-Service Reliance Agreements on Basic Research and oversight is provided by tri-Service 6.1 cooperation. The work in this PE is related to 62111N,

PAYOFF/UTILIZATION:

The payoffs of this Subelement include research support for: (a) advanced training technology by the Navy training community, (b) operational man-machine systems, and (c) manpower and personnel policies and practices which affect recruitment, retention, and productivity.

This research effort is the primary means for determining scientific understanding and the needed technologies underlying improvements in Navy capabilities and operations. Increased research is needed to reach technological parity in some areas and gain/maintain superiority in others. Research is directed to search out, assess, and exploit potential solutions to Naval problems.

PROJECT OVERVIEW

		92	93
PROJECT: RR04206	PERSONNEL AND TRAINING	$ 6.0M	$ 7.4M
PE: 61153N	DEFENSE RESEARCH SCIENCES, SUBELEMENT 42: COGNITIVE AND NEURAL SCIENCES		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	OFFICE OF NAVAL RESEARCH		

PROJECT SYNOPSIS:

The objective of this Project is to begin theoretical work toward estimating complex abilities from multidimensional tests.

Cognitive processes research will emphasize dynamic changes in knowledge representation as a novice learner progresses toward expert level skill, and learning and training research will begin to include social and motivational factors in transitioning from traditional classroom instruction to learning environments with advanced technologies such as intelligent tutor systems.

PAYOFF/UTILIZATION:

The payoff of this Project includes the solution of many training problems in the Navy through the introduction of more individualized, automated, and simulator-based instruction.

PROJECT OVERVIEW

		92	93
PROJECT: RR04208	GROUP PSYCHOLOGY	$ 3.0M	$ 3.2M
PE: 61153N	DEFENSE RESEARCH SCIENCES, SUBELEMENT 42: COGNITIVE AND NEURAL SCIENCES		
CONGRESSIONAL CATEGORY:	MANPOWER & PERSONNEL		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	OFFICE OF NAVAL RESEARCH		

PROJECT SYNOPSIS:

The objective of this Project is to increase understanding of the psychological and organizational variables that determine the performance of individuals, groups, teams, and units in the Navy and Marine Corps.

PAYOFF/UTILIZATION:

The payoffs of this Project include improved quality of Navy and Marine Corps personnel, reduction of personnel attrition and losses of Petty Officers in shortage categories, and enhanced effectiveness of military and civilian employees.

PROJECT OVERVIEW

		92	93
PROJECT: RR04209	ENGINEERING PSYCHOLOGY	$ 2.2M	$ 2.8M
PE: 61153N	DEFENSE RESEARCH SCIENCES, SUBELEMENT 42: COGNITIVE AND NEURAL SCIENCES		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	OFFICE OF NAVAL RESEARCH		

PROJECT SYNOPSIS:

The objective of this Project is the development of enhanced group decision-making procedures.

PAYOFF/UTILIZATION:

The payoff of this Project will be improved human performance in high technology systems to meet Navy and Marine Corps operational requirements.

PROGRAM ELEMENT OVERVIEW

PE: 62131M MARINE CORPS LANDING FORCE TECHNOLOGY

CONGRESSIONAL CATEGORY: MANPOWER & PERSONNEL

DoD ORGANIZATION: MC

FUNDING: FY92 $ 0.6M (FY93 PRESIDENT'S BUDGET)
FY93 $ 0.6M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element, a portion of which is dedicated to Manpower, Personnel and Training, is to develop the technologies needed to support unique USMC expeditionary capabilities and the requirement to operate in a variety of climates and tactical scenarios worldwide, conducting amphibious, contingency, and Special Operations.

Specific requirements documents are the Marine Air Ground Task Force Master Plan, the Marine Corps Long Range Plan, and the Marine Corps Campaign Plan. This Program Element contains multiple projects in various disciplines. All projects are continuous, but individual tasks vary to align emerging requirements with evolving technology. This Program Element supports the DoD Science and Technology Strategy in Advanced Land Combat Vehicles. It also supports the DoD Critical Technologies plan in the following areas: Simulation and Modeling, Passive Sensors, Signal Processing, Signal Control, Data Fusion, High-Energy Density Materials, Biotechnology, and Composite Materials.

The in-house organizations responsible for this program are the Naval Ocean Systems Center, Naval Surface Warfare Center, Naval Civil Engineering Laboratory, Naval Air Warfare Center, Navy Personnel Research and Development Center, Naval Research Laboratory, Harry Diamond Laboratories, Department of Energy, MCRDAC, and LANL.

RELATED ACTIVITIES:

Related activities are: PE 62232N, C3 Technology; PE 64801SA, Army Tactical Command and Control; PE 62121N, Surface Ship Technology

This program is conducted in accordance with the ongoing Reliance planning process and contains no unwarranted duplication of effort among the military Departments.

PAYOFF/UTILIZATION:

The payoffs of the MPT portion of this Program Element include: (a) integration of the weapons simulator with the neuroelectric testing system, and (b) established correlations between marksmanship and neuroelectric waveforms.

PROJECT OVERVIEW

		92	93
PROJECT: CF31P14	MARINE CORPS MANPOWER & TRAINING TECHNOLOGY	$ 0.6M	$ 0.6M
PE: 62131M	MARINE CORPS LANDING FORCE TECHNOLOGY		
CONGRESSIONAL CATEGORY:	MANPOWER & PERSONNEL		
DoD ORGANIZATION:	MC		
RESPONSIBLE ORGANIZATION:	NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER		

PROJECT SYNOPSIS:

The objective of this Subproject is to develop technologies to: (a) model the retention behavior of the force, (b) evaluate its performance on force management factors, (c) support management policy actions, and (d) develop the technologies necessary to ensure that training is efficiently developed and performed and results in effective performance. This project supports Marine Corps requirements to manage the enlisted and officer force in an economical and effective manner.

This project will also identify technologies that allow the best return on manpower dollar investments. Models are being developed to provide a common basis for both enlisted force planning and assignment. Quality of Life models are being developed to maximize both the capability of the Marine Corps personnel and to ensure most effective use of personnel support programs. Technologies to more effectively and efficiently train personnel are being developed in support of Over the Horizon (OTH) operations.

In FY92 plans include: (a) continuance of FY91 neuroelectric predictors effort, (b) model of systematic relationships, (c) development of mathematical models to estimate attrition, and (d) providing technical support to OTH efforts.

In FY93, plans include: (a) design of field validation of models in quality of life effort, (b) development of OTH gaming specs, prototypes and scenarios, and (c) completion of attrition model in manpower management.

PAYOFF/UTILIZATION:

The payoff of this Subproject include: (a) integration of weapons simulator with neuroelectric testing system and collection of data/refined performance measures, (b) transition of Force Management Forecasting, (c) establishment of correlations between marksmanship and neuroelectric waveforms, and (d) identification of range of OTH training requirements.

PROGRAM ELEMENT OVERVIEW

PE: 62233N	MISSION SUPPORT TECHNOLOGY: PERSONNEL, TRAINING AND SIMULATION TECHNOLOGY AREA
CONGRESSIONAL CATEGORY:	MANPOWER & PERSONNEL EDUCATION & TRAINING SIMULATION & TRAINING DEVICES HUMAN FACTORS
DoD ORGANIZATION:	NAVY
FUNDING:	FY92 $ 9.5M (FY93 PRESIDENT'S BUDGET) FY93 $ 13.6M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to support the DoD Science and Technology (S&T) Strategy in Simulation and Modeling, and Affordability. The Program Element provides mission support technologies essential for all Naval operations.

Personnel and training technologies enhance the Navy's ability to select, assign and train people for highly demanding jobs. Personnel performance and safety technologies improve safety of operational personnel and enhance performance capabilities under adverse conditions. Logistics technologies increase operational readiness through effective management and movement of supplies ashore and at sea, and advance techniques for more cost effective construction and maintenance of shore and off-shore facilities. Environmental protection technologies will improve Navy-unique capabilities to meet air- and water-quality regulatory standards and to reduce toxic waste generation. Chemical and Biological Defense (CBD) technologies improve the ability to respond to existing and future CBD threats.

The in-house developing organizations responsible for this program are the Naval Air Warfare Center, Navy Personnel Research and Development Center, Naval Training Systems Center, Naval Medical Research Institute, Naval Civil Engineering Laboratory, Naval Surface Warfare Center, Naval Research Laboratory, and the Naval Command, Control and Ocean Surveillance Center.

Funding and Project information indicated includes only the Manpower, Personnel, and Training portion of this Program Element.

RELATED ACTIVITIES:

This Program Element adheres to tri-Service Reliance Agreements on Training Systems, Manpower and Personnel, Medical, Chemical and Biological defense, and Civil engineering. Oversight is provided by the Training and Personnel systems Science and Technology Evaluation and Management committee (TAPSTEM) for Training Systems and Manpower and Personnel programs; the Armed Services Biomedical Research Evaluation and Management (ASBREM) committee for Biomedical programs; the Joint Directors of Laboratories; the Joint Chemical Effects Data Research Guide (JCEDAR) and Joint Development Objectives Guide (JDOG) for CBD programs; and Joint Engineers for Civil engineering. Related Program Elements include PE 62314N, Undersea Surveillance and Weapons Technology; PE 62111N, AAW/ASUW Technology; PE 62232N, Command, Control and Communications Technology; and PE 62131M, Marine Corps Landing Force Technology.

PAYOFF/UTILIZATION:

The payoffs of the MPT portion of this Program Element include: (a) completed evaluation of a low-cost analysis and debrief system for air combat training, and (b) completed development of a prototype desk-top simulator for training various aspects of radio navigation in a more cost-effective fashion.

PROJECT OVERVIEW

		92	93
PROJECT: RM33D40	TACTICAL DECISION-MAKING UNDER STRESS (TADMUS)	$ 1.9M	$ 1.9M
PE: 62233N	MISSION SUPPORT TECHNOLOGY: PERSONNEL, TRAINING AND SIMULATION TECHNOLOGY AREA		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVAL TRAINING SYSTEMS CENTER		

PROJECT SYNOPSIS:

The objective of the Tactical Decision-Making Under Stress (TADMUS) program is to apply recent developments in decision theory, individual and team training, and information display to the problem of enhancing tactical decision quality under conditions of stress.

This will be accomplished by a cooperative program in human factors and training involving two principal laboratories (NOSC and NTSC), as well as other Navy, industrial, and academic organizations. The technology will be demonstrated and evaluated in the context of anti-air scenarios, and general principles will be developed that will be applicable to other warfare areas.

There are two Projects within the program, one for each of the principal laboratories.

The program is comprised of five tasks. (a) Task Definition and Measurement: define the operational tasks, set up laboratories in which to study those tasks, develop a strong performance measurement capability, and develop knowledge of the decision-making processes for that operational environment. (b) Examination of Stress Effects on Decision-Making: select a number of stressors for investigation, determine which stressors should be used as approximations to actual combat stress, and determine how to quantify their effects. (c) Development of Decision Support Principles: produce an experimental decision support system, and evaluate the prototype in simulated tactical environments, initially in laboratory settings and later during

at-sea exercises. Additional products of this task will be general principles for advanced decision support systems to enhance human performance under stress. (d) Development of Training and Simulation Principles: develop and demonstrate a variety of individual and team training strategies and techniques to minimize the adverse effects of stress. Products of this task will include principles for overtraining decision-making skills, training decision makers in pattern recognition, training interventions that will attenuate the effects of stress on team performance, training leadership skills, and inducing stress during training. (e) Development of Display Principles: examine man-machine interface concepts which maximize the effectiveness of tactical decision aids under stressful conditions. Products of this task will include display principles for predictive displays, situation assessment, option generation, resolution of conflicting or ambiguous information, and cognitive consistency among team members.

The Naval Ocean Systems Center and the Naval Training Systems Center will accomplish the tasks cooperatively, with both laboratories involved in all of the tasks to some extent.

This Project will be managed by the Naval Training Systems Center and is principally concerned with development of training and simulation principles to counteract stress.

In FY92, plans include beginning evaluation of instructional strategies for improving individual and team tactical decision-making under stressful conditions.

PAYOFF/UTILIZATION:

The payoff of this Project is the enhancement of tactical decision quality under conditions of stress through the application of recent developments in decision theory, individual and team training, and information display.

PROJECT OVERVIEW

		92	93
PROJECT: RM33D60	TACTICAL DECISION-MAKING UNDER STRESS (TADMUS)	$ 1.8M	$ 1.9M
PE: 62233N	MISSION SUPPORT TECHNOLOGY: PERSONNEL, TRAINING AND SIMULATION TECHNOLOGY AREA		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVAL OCEAN SYSTEMS CENTER		

PROJECT SYNOPSIS:

The objective of the Tactical Decision-Making Under Stress (TADMUS) program is to apply recent developments in decision theory, individual and team training, and information display to the problem of enhancing tactical decision quality under conditions of stress.

This will be accomplished by a cooperative program in human factors and training involving two principal laboratories (NOSC and NTSC), as well as other Navy, industrial, and academic organizations. The technology will be demonstrated and evaluated in the context of anti-air scenarios, and general principles will be developed that will be applicable to other warfare areas.

There are two Projects within the program, one for each of the principal laboratories.

The program is comprised of five tasks. (a) Task Definition and Measurement: define the operational tasks, set up laboratories in which to study those tasks, develop a strong performance measurement capability, and develop knowledge of the decision-making processes for that operational environment. (b) Examination of Stress Effects on Decision Making: select a number of stressors for investigation, determine which stressors should be used as approximations to actual combat stress, and determine how to quantify their effects. (c) Development of Decision-Support Principles: produce an experimental decision support system and evaluate the prototype in simulated tactical environments, initially in laboratory settings and later during

at-sea exercises. Additional products of this task will be general principles for advanced decision-support systems to enhance human performance under stress. (d) Development of Training and Simulation Principles: develop and demonstrate a variety of individual and team training strategies and techniques to minimize the adverse effects of stress. Products of this task will include principles for overtraining decision-making skills, training decision makers in pattern recognition, training interventions that will attenuate the effects of stress on team performance, training leadership skills, and inducing stress during training. (e) Development of Display Principles: examine man-machine interface concepts which maximize the effectiveness of tactical decision aids under stressful conditions. Products of this task will include display principles for predictive displays, situation assessment, option generation, resolution of conflicting or ambiguous information, and cognitive consistency among team members.

The Naval Ocean Systems Center and the Naval Training Systems Center will accomplish the tasks cooperatively, with both laboratories involved in all of the tasks to some extent.

This Project will be managed by the Naval Ocean Systems Center and is principally concerned with development of decision-support principles and display principles for decision support systems.

In FY92, plans include beginning evaluation of instructional strategies for improving individual and team tactical decision-making under stressful conditions.

PAYOFF/UTILIZATION:

The payoff of this Project is the enhancement of tactical decision quality under conditions of stress through the application of recent developments in decision theory, individual and team training, and information display.

PROJECT OVERVIEW

		92	93
PROJECT: RM33M20	MANPOWER AND PERSONNEL TECHNOLOGY	$ 2.5M	$ 3.2M
PE: 62233N	MISSION SUPPORT TECHNOLOGY: PERSONNEL, TRAINING AND SIMULATION TECHNOLOGY AREA		
CONGRESSIONAL CATEGORY:	MANPOWER & PERSONNEL		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER		

PROJECT SYNOPSIS:

The objectives of this Project are to: (a) improve accessioning and recruiting techniques, (b) improve the quality and retention of personnel, (c) improve the fit between personnel and jobs, (d) enhance the motivation and productivity of personnel, and (e) increase the effectiveness of managers and policy makers by giving them better tools for measuring and predicting the consequences of their decisions.

As the Navy reduces manning while attempting to maintain readiness and expand its mission, efficiencies in using its personnel force become crucial concerns. The Exploratory Development (6.2) FY92/93 Investment Strategy indicates that reductions in force levels must be accompanied by restructuring of the force to meet emerging challenges. Restructuring of manpower requires greater insights regarding personnel assets coupled with increased capabilities for matching those assets to operational needs. Tasks in this Project are directed at more accurate measures of aptitudes, improved technologies for selection and classification, expanded ability to monitor perceptions, attitudes and quality of life, enhancing productivity, and ultimately, improving both retention and readiness.

In FY92/93, plans include twelve tasks arrayed into five thrust areas.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included the development and evaluation of a computer model that was used to allocate FY92 recruiting resources more effectively.

PROJECT OVERVIEW

		92	93
PROJECT: RM33T21	INSTRUCTIONAL TECHNOLOGY	$ 0.9M	$ 1.2M
PE: 62233N	MISSION SUPPORT TECHNOLOGY: PERSONNEL, TRAINING AND SIMULATION TECHNOLOGY AREA		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVAL TRAINING SYSTEMS CENTER		

PROJECT SYNOPSIS:

The objective of this Project is to improve the Navy's ability to train personnel effectively, rapidly, and economically.

This objective corresponds to training systems technology goals, as stated in the FY91/POM92 Mission Area Strategy for Mission Support, such as developing state-of-the-art technology for: computer-based intelligent training systems; communication and problem-solving skills; individual and group performance measurement; and cost-effective simulators and training devices.

Specific tasks which meet these objectives are:

(a) Radio Instruments Orientation Trainer (RIOT): software modifications, including addition of instructional features, will be completed; planning for the training effectiveness evaluation (TEE) and the implementation of RIOT into the flight training curriculum will begin; coordination with the training administration personnel will continue as the TEE is executed to ensure that relevant lessons learned are included in the implementation effort.

(b) Aircrew Coordination and Performance: the behavioral observation scale and rating scale will be further refined; issues of training coordination for a glass cockpit situation (cockpit automation) will be investigated, and preliminary research will compare coordination between a pilot and copilot who are transitioning to a glass cockpit aircraft on two simulators with different levels of fidelity.

(c) Retention of Trainined Skills: existing literature will be surveyed, a needs analysis will be conducted at select Navy sites, and an experimental testbed facility will be established; hypotheses will be generated and pilot testing will begin.

(d) Embedded Training Technology Identification and Development: the software tool, summarizing current ET research and implementation in all services, will be completed; a report will be completed describing and summarizing the field evaluation of "Knowledge Compilation" to the Naval Tactical Data System's embedded operator training component (L-TRAN).

(e) Aircrew Instructional Systems: system refinements, particularly voice recording and playback, a final technical report, software documentation, and hardware specifications will be provided.

In FY92, plans include a complete evaluation of techniques to improve individual and unit productivity in the Navy civilian workforce.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included the completed development of a prototype desk-top simulator for training various aspects of radio navigation in a more cost-effective fashion.

PROJECT OVERVIEW

		92	93
PROJECT: RM33T23	TRAINING SYSTEMS TECHNOLOGY	$ 1.2M	$ 1.5M
PE: 62233N	MISSION SUPPORT TECHNOLOGY: PERSONNEL, TRAINING AND SIMULATION TECHNOLOGY AREA		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER		

PROJECT SYNOPSIS:

The objective of this Project is to explore how new technologies can be brought to bear on reducing the personnel-intensive character of Navy training.

This is important not only because personnel costs continue to be a major expenditure, but because personnel are becoming an increasingly scarce resource. The Mission Area Overviews for the Exploratory Development (6.2) FY92/93 Investment Strategy indicate that training systems must play an increased role in maintaining desired readiness levels in the face of reduced budgets. The technology challenge is to develop innovative approaches that will produce systems with both extended capabilities and lower costs.

This Project comprises two thrusts, Instructional Science and Training Technology, that feed into five training technology product lines. Both thrusts address drivers identified in the FY92/93 Mission Area Overview for Support Technology.

PAYOFF/UTILIZATION:

The recent Gulf War emphasized the importance of maintaining a Reserve Force which is adequately trained and in a high state of readiness. On-the-job training offers strong applicability to the Reserve Force.

PROJECT OVERVIEW

		92	93
PROJECT: RM33T24	SIMULATION TECHNOLOGY	$ 0.9M	$ 1.3M
PE: 62233N	MISSION SUPPORT TECHNOLOGY: PERSONNEL, TRAINING AND SIMULATION TECHNOLOGY AREA		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVAL TRAINING SYSTEMS CENTER		

PROJECT SYNOPSIS:

The objectives of this Project are to develop and demonstrate the feasibility of technologies for improving the training effectiveness and reducing the cost of environment and operational equipment simulation systems in training devices for Navy weapon system, platform, and sensor operators.

These objectives correspond to training system technology goals, as stated in the FY91/POM92 Mission Area Strategy for Mission Support, such as simulating advanced sensor system displays and ASW simulation. Tasks supporting these objectives follow.

(a) Simulation of Advanced Sensors: preliminary findings will be used to determine the adequacy of using an unenhanced DMA derived database; optimal database/memory management schemes will be determined and implemented; evaluation and modification will be performed in an iterative process incorporating recommendations from Fleet users; a major demonstration of the developed technology is planned for this year.

(b) CIG/Cost Performance Enhancement: the Low Cost CIG IRIS Workstation will be field upgraded and the changes will be evaluated in the simulator testbed being developed for the Carrier Based Training 6.3 project.

(c) Synthesis of Active Acoustic Signals and Displays for Training: the work on active sonar modeling for ASW will be documented ; new research will concentrate on mine synthesis; the simple mine model will be improved to provide the characteristics on a display that operators use to classify mines; static CRT displays will be created to depict the BSY-2 mine avoidance display, and the SQQ-30 display.

(d) Moving Weapons Simulation: 3-D tracer and explosion effects will be developed for small arms simulation.

(e) Crystal Target Projector: a Ce:(Y,Gd)AG CRT and a Ce:BEL CRT will be demonstrated; a single crystal video projector in dome screen will be evaluated; a report will be written on integrated single crystal projector operating requirements, Ce:BEL and Ce:(T,Gd)AG characteristics, and color projector options; an integrated single crystal projector will be delivered.

(f) Tactical Training Instructor Components (TACTICS): products for both the automatic scenario generator and automatic scenario control will be produced in FY92.

(g) Advanced Computer Applications: the components of the experimental workstation will be aquired, assembled, and the first relative performance experiments will be designed and executed.

In FY93, plans include completed development of simulation technology to improve training for mine detection and recognition using active sonar.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments for the Simulation of Advanced Sensors task are as follows: (a) a model was constructed which met the objectives, (b) aggressor targets were instantly removed from a training scenario as they were disabled by weapon fire from trainees, (c) an array of infrared emitting diodes was placed above the projection screen and a detector harness was developed to detect a modulated infrared beam from this array, which increased tactical realism in training by requiring trainees to seek appropriate cover when engaged by the aggressor targets, and (d) an innovative weapon tracking system which generates accurate weapon position data at over 300 Hz was designed and constructed. This device is capable of continuously tracking weapon aim points for up to 9 trainees. Joint Service 6.4 funds were received and an engineering prototype will be constructed and tested.

PROJECT OVERVIEW

		92	93
PROJECT: RM33T25	VIRTUAL ENVIRONMENT TRAINING TECHNOLOGY	$ 0.3M	$ 2.7M
PE: 62233N	MISSION SUPPORT TECHNOLOGY: PERSONNEL, TRAINING AND SIMULATION TECHNOLOGY AREA		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVAL TRAINING SYSTEMS CENTER		

PROJECT SYNOPSIS:

The objective of this Project is to demonstrate the feasibility of VE-based training and evaluate the potential for improving cost and training effectiveness of training through VE-based training systems.

Although a fully developed VE training system interface would be applicable to all training scenarios, the current state of the art of VE technology is such that full development is not expected for 5-10 years. In the meantime, there are training applications which can be investigated within the current limitations of VE interface performance.

In FY92, plans include: (a) developing VE-based instructional systems and advanced arm/hand/finger transducers and displays, (b) designing VE system evaluation instrumentation, (c) designing, integrating, and demonstrating a VE-based air-to-air debriefing system using an existing instructional system, and (d) completing development of computer-based tools that reduce the development costs and improve the comprehensibility of instructional text.

In FY93, plans include beginning evaluation of the effectiveness of VE (artificial reality) simulation technology in a variety of low-cost training applications to maintain and enhance operator skills.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) defining the current state of the art of VE technology and formulating a plan for developing and exploiting VE technology in military training applications, and (b) completed evaluation of a low-cost analysis and debrief system for air combat training, resulting in substantial cost savings and performance enhancement in Navy and Air Force applications.

PROGRAM ELEMENT OVERVIEW

PE: 62234N — SYSTEMS SUPPORT TECHNOLOGY: HUMAN FACTORS TECHNOLOGY AREA

CONGRESSIONAL CATEGORY: HUMAN FACTORS

DoD ORGANIZATION: NAVY

FUNDING:
FY92 $ 3.7M (FY93 PRESIDENT'S BUDGET)
FY93 $ 3.9M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to provide the Navy with the capability, resources, and expertise to implement advanced weapon and platform system concepts.

Materials and electronic devices are enabling technologies addressing fundamental systems limitations in performance, reliability, and affordability. Computer Technology includes hardware, software, machine intelligence, and software/systems engineering. Human Factors Technology addresses high-payoff topics in man-machine interfaces, decision making, and information transfer.

This Program Element supports DoD Science and Technology (S&T) Strategy and the following DoD Critical Technologies: Microelectronics, Software Producibility, Photonics, Sensitive Radars, Passive Sensors, Signal Processing, Composite Materials, Superconductivity, and Biotechnology.

All work in this Program Element is jointly planned by the Army, Navy, and Air Force in accordance with tri-Service Reliance agreements.

The in-house developing organizations responsible for this program are the Naval Civil Engineering Lab, Naval Air Warfare Center, Naval Undersea Warfare Center, Naval Command, Control and Ocean Surveillance Center, Naval Research Lab, and Naval Surface Warfare Center.

Funding and Project information indicated includes only that portion of the Program Element which refers to Training and Personnel Systems Technology.

RELATED ACTIVITIES:

This Program Element adheres to tri-Service Reliance Agreements on Advanced Materials, Electronic Devices, and Software with oversight provided by the Joint Directors of Laboratories. Work in this PE is related to and fully coordinated with efforts in PEs 61102A, 62105A, 62705A, 62783A, 63120A, 62789A, 63342A, 62111N, 62113N, 62121N, 62122N, 62223N, 62314N, 62323N, 61102F, 62102F, 62204F, 62702F, 63112F, 63203F, 63728F, and 63758F in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication of effort among the Military Departments.

PAYOFF/UTILIZATION:

The payoffs of the Training and Personnel Systems Technology portion of this Program Element is the provision to Navy system developers of resources and expertise in the areas of man-machine interface, decision-making, and the development of training and simulation principles, thus enabling improved system design with better utilization of the human component.

Other payoffs include development of an advanced technique for capturing and manipulating target information on command and control systems.

PROJECT OVERVIEW

		92	93
PROJECT: RS34H20	HUMAN FACTORS TECHNOLOGY	$ 3.2M	$ 3.9M
PE: 62234N	SYSTEMS SUPPORT TECHNOLOGY: HUMAN FACTORS TECHNOLOGY AREA		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVAL OCEAN SYSTEMS CENTER		

PROJECT SYNOPSIS:

The objectives of this Project are to maximize the effectiveness of commanders and operators, improve the Fleet's ability to process information quickly and accurately, reduce the requirements for manpower and training, and lower the frequency and cost of accidents.

Human Factors technology is the application of behavioral science (including human cognition, perception, and anthropometry) to the design and engineering of manned systems with precisely these goals in mind. No other technology addresses the critical interface between man and machine where significant progress toward these specific goals can be achieved.

Human Factors technology includes the development of Man-Machine Interface (MMI) principles, methodologies, system concepts, and facilities which permit the guidance, analysis, and evaluation of system designs or procedures which directly support the operational user.

Next-generation decision aiding technology will provide users, ranging from console operators to fleet commanders, the capacity to process and utilize large amounts of information easily and effectively. This technology will permit significant improvements in decision-making quality and timeliness under conditions which currently overload operational combat teams. At the same time, manning reductions will be possible through the elimination of manual data processing requirements. The uniqueness of this thrust is that it is oriented toward the generic Navy user, rather than the computer-literate, operational expert. Our vision of this future is that the decision maker will

interact with decision support systems as he would interact with other people - no specialized training for each system, learning idiosyncrasies as you go, natural language voice interaction, needs anticipated, etc. In order to realize these potentials, this thrust includes tasks aimed at understanding human decision-making processes in operational environments, as well as tasks that use this information to develop both optimal display/control interfaces and the decision aids themselves.

In FY92, plans include: (a) developing prototype designs for CAD/CAE tools for large-scale, complex Navy systems, and (b) beginning development of guidelines for adaptive function allocation between pilots and intelligent automated systems.

In FY93, plans include: (a) demonstrating computer learning with multiple threats via simulation of a multi-plane dogfight, (b) completing development of an intelligent tutoring technique to reduce training instructor workload, (c) demonstrating a performance model of notional large-scale Navy airborne systems, and (d) demonstrating the design through simulation software for Navy airborne systems.

PAYOFF/UTILIZATION:

The payoffs of this Project include new information about human detection and decision-making performance across a wide range of Navy missions (e.g., sonar detection, air-to-ground attack, battle group force coordination, etc.), with the data being integrated into innovative display systems for submarines, aircraft cockpits, ship CICs, and ashore surveillance systems.

In FY91, specific accomplishments included: (a) starting evaluation of commercial Computer-Aided Design/Computer-Aided Engineering (CAD/CAE) tools for large-scale, complex Navy systems, and (b) development of an advanced technique for capturing and manipulating target information on command and control systems.

PROJECT OVERVIEW

		92	93
PROJECT: RS34H21	BIOPSYCHOMETRIC ASSESSMENT	$ 0.5M	$ 0.0M

PE: 62234N — SYSTEMS SUPPORT TECHNOLOGY: HUMAN FACTORS TECHNOLOGY AREA

CONGRESSIONAL CATEGORY: HUMAN FACTORS

DoD ORGANIZATION: NAVY

RESPONSIBLE ORGANIZATION: NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER

PROJECT SYNOPSIS:

The objective of this Project is to provide technology to monitor and enhance the performance of combat system operators. Techniques will be developed to assess the combat readiness of system operators and to enhance their operational performance. These techniques will be based on recordings of electroencephalograms and event-related brain potentials, which are correlated with cognitive states. Such recordings will be used to build models that predict the performance of operators in real time. Enhancement of performance in real time will be accomplished by making man/machine interaction more sensitive to the predictions of these models. For example, model-based feedback to the operator could be used to correct performance by changing the tasking or reallocating resources to the task.

The technology from this project will enhance the performance of combat system operators and increase their combat readiness. The time frame for realizing benefits is in the near-term (2-5 years) for developing performance assessment and monitoring methods, and in the mid-term (5-10 years) for developing methods of intervention or system modifications to enhance performance.

Human performance of combat-related cognitive tasks, such as target detection, recognition, and tracking by combat system operators, is variable, unpredictable, and often below acceptable levels. In part, this is due to complexity, variation, and design inadequacies in combat systems, which make it difficult for operators to perform consistently. Such human performance problems can have serious mission consequences and may have contributed to incorrect or delayed tactical decisions in past incidents.

Another source of performance problems comes from within the human operator. For example, performance is degraded by fatigue and combat stress. Such factors may temporarily lead to cognitive states that are inappropriate for the workload level imposed by the combat system. At one extreme, cognitive resources are insufficient for the task at hand. This condition, known as cognitive overload, is associated with impaired decision making, which increases the likelihood of human errors. At the other extreme, combat systems induce fatigue and inattention in the operator by presenting information at low temporal rates or by assuming too much of the workload. This condition, known as cognitive overload, is associated with impaired decision making, which increases the likelihood of human errors. At the other extreme, combat systems induce fatigue and inattention in the operator by presenting information at low temporal rates or by assuming too much workload. This condition, known as cognitive underload, is associated with decreased vigilance or decreased likelihood that the operator will detect and respond correctly to critical events. Between these extremes, the cognitive state of a human operator will vary over time as a result of unstable metabolic, physiological, and psychological factors.

In FY92, the ERP methods and relationships to performance that have been defined in Phase 1 of this Project will be evaluated in three advanced tests. These advanced tests will serve to demonstrate the validity of biopsychometric technology for operational applications.

PAYOFF/UTILIZATION:

In FY91, specific accomplishes included: (a) completion of closed loop adaptive systems, (b) completed classification of single epoch evoked potentials using neural networks, (c) examination of performance-related ERP effects, using task-relevant and irrelevant stimuli, in three different tasks: perceptual, memory, and computational, (d) collecting additional data on the visual sonar simulation task, (e) analysis and the results of the auditory sonar task data set collected at the end of the previous year, and (f) characterizing the effects of sustained work on human performance and development of research protocols that yield measures of performance precise enough to be useful in studies of fatigue countermeasures.

PROGRAM ELEMENT OVERVIEW

PE: 63707N	MANPOWER, PERSONNEL, AND TRAINING ADVANCED TECHNOLOGY
CONGRESSIONAL CATEGORY:	VARIOUS
DoD ORGANIZATION:	NAVY
FUNDING:	FY92 $ 13.1M (FY93 PRESIDENT'S BUDGET) FY93 $ 18.5M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to develop and demonstrate advanced concepts in the areas of Manpower, Personnel, and Training. Consistent with FY92 Congressional language, it consolidates four Program Elements (63701N, 63707N, 63720N and 63733N) into one (63707N). There are four broad areas of research:

A. Air and Ship Human Factors Engineering (HFE): These two Projects (W0542 and R1771) improve fleet readiness through human factors technology. This technology provides a better fit between the operator, equipment, and mission so that hardware systems will be operated with fewer human-induced errors and with greater safety and maintainability. The objectives of this program are: (1) to improve crew and work station design and evaluation methods so as to reduce errors and increase effectiveness of operations; (2) to establish target-acquisition and weapon-system standards for displays people can understand; (3) to develop airborne tactical decision aids for fleet Air Defense, ASW and strike missions; (4) to provide initial human factors support for new systems; and (5) to improve the integration between platforms and their crews. The projects also develop and evaluate new techniques for human factors based system design.

B. Manpower and Personnel Systems: In view of declining force levels, effective utilization and allocation of human resources is vital. This Project improves the utilization and allocation of Navy personnel through the development of simulation models, decision support tools, and enhanced test and measurement techniques. Enabling technologies include mathematical optimization, information systems technology, statistical and econometric forecasting, and human performance and attitude measurement. The results of this Project will help the Navy to forecast manning requirements and adjust strength levels without reducing readiness.

C. Education and Training Development: This Project improves training effectiveness and reduces training costs by focusing technology on individual training, team training and the retention of complex skills. The Project applies automation, instructional and cognitive sciences to training development, delivery, evaluation, and execution.

D. Simulation and Training Devices: This Project improves mission effectiveness and safety by applying knowledge about human learning to engineering design of training systems. The Project funds proof-of-concept demonstrations of simulators and training technology to improve training and mission rehearsal capability.

RELATED ACTIVITIES:

This Program Element adheres to the tri-Service Reliance Agreements on Training Systems and Manpower and Personnel.

PAYOFF/UTILIZATION:

The payoffs of this Program Element include: (a) development and evaluation of new techniques for human factors based system design, (b) improved ability for the Navy to forecast manning requirements, (c) application of automation, instructional and cognitive sciences to training development, and (d) demonstration of simulator and training technology to improve training capability.

PROJECT OVERVIEW

		92	93
PROJECT: R1770	MANPOWER AND PERSONNEL SYSTEMS	$ 1.0M	$ 3.5M
PE: 63707N	MANPOWER, PERSONNEL, AND TRAINING ADVANCED TECHNOLOGY		
CONGRESSIONAL CATEGORY:	MANPOWER & PERSONNEL		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER		

PROJECT SYNOPSIS:

The objective of this Project is to improve the utilization and allocation of Navy personnel through the development of simulation models, decision-support tools, and enhanced test and measurement techniques.

Enabling technologies include mathematical optimization, information systems technology, statistical and econometric forecasting, and human performance and attitude measurement.

In FY92, plans include: (a) completing enlisted community management planning and analysis system prototype, (b) testing algorithms and methodologies to project end-of-contract populations for use in force projections, (c) field testing information delivery and Decision Support System (DSS) for allocating recruiting resources, and (d) validating analytical methodologies and tools for simulating the effects of joint duty requirements on officer community management.

In FY93, plans include: (a) completing officer allocation and distribution Decision Support System (DSS), (b) developing surrogate measures for personal readiness, (c) begining development of an interactive system for evaluating impact of changes in combat exclusion on readiness, and (d) completing development of an officer community management/integrated officer strength planning system.

The in-house agency for this Project is Navy Personnel Research and Development Center, San Diego, CA.

RELATED ACTIVITIES:

Work in this Project is related to and fully coordinated with efforts in Program Elements 62233N, Mission Support Technology; 64703N, Personnel, Training, Simulation, and Human Factors; 63732M, Marine Corps Advanced Manpower/Training Systems; 63007A, Human Factors, Personnel and Training Advanced Technology; and 63227F, Personnel, Training, and Simulation Technology.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) prototype on-line, interactive enlisted assignment system, (b) development of PC-based system for determining and analyzing manpower authorizations at the rating and unit level, and (c) validation of selection standards for six enlisted job categories.

PROJECT OVERVIEW

		92	93
PROJECT: R1771	SHIP HUMAN FACTORS ENGINEERING	$ 1.9M	$ 2.1M
PE: 63707N	MANPOWER, PERSONNEL, AND TRAINING ADVANCED TECHNOLOGY		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVAL OCEAN SYSTEMS CENTER		

PROJECT SYNOPSIS:

The objective of this Project is to improve shipboard and airborne performance by incorporating human factors engineering into early system acquisition.

Thrust areas of this Project include: (a) tactical information management and decision-making, (b) multisensor integration, (c) decision support systems, and (d) advanced visualization displays.

In FY92, plans include: (a) developing Electronic Warfare (EW) display format designs using new operator console, (b) developing new integrated display formats and man-machine interface dialogue for sonar console acquisition program, (c) obtaining ASW acoustic data for lab simulation and test on Advanced Technology ASW Display (ATAD), (d) developing sensor to display hardware interface required by ATAD man-in-the-loop tests, (e) completing MILSTAR Operator Job Aid (MORA) prototype and conduct tests on USS Coronado, and (f) completing MORA specifications, user manuals, and training manuals.

In FY93, plans include: (a) completing EW / sonar display formats and incorporate into hardware acquisition specifications, (b) completing interface of ATAD displays to ASW sensor hardware and test using ASW Commander staff, and (c) start requirements analysis for Afloat Planner and Tactics Evaluator decision aid program.

This continuing Project was transferred from 63701N in FY92.

RELATED ACTIVITIES:

This Project is related to and fully coordinated with efforts in Program Elements 62233N, Mission Support Technology; 64703N, Personnel, Training, Simulation and Human Factors; 63216A, Synthetic Flight Simulator Development; and 63227F, Personnel, Training and Simulation Technology.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) completion of draft functional specifications for SLQ-32 replacement console, (b) identification of expert SLQ-32 operators' management and data integration techniques and incorporated them into software aids and display formats, (c) completion of analysis of SQY-1 display requirements, reducing the number of proposed display formats by a factor of 4; analysis will be used in procurement specifications, (d) development of 3-D visual and aural displays for Advanced Technology ASW Display (ATAD) program, (e) incorporation of existing ASW display software into ATAD program and wrote software specifications needed for proof-of-concept application software, (f) continued to build and evaluate MILSTAR Operator Job Aid (MORA) software using available off-the-shelf software and hardware, and (g) started development of the MORA human-computer interface.

PROJECT OVERVIEW

		92	93
PROJECT: R1772	EDUCATION AND TRAINING DEVELOPMENT	$ 4.1M	$ 6.3M
PE: 63707N	MANPOWER, PERSONNEL, AND TRAINING ADVANCED TECHNOLOGY		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER		

PROJECT SYNOPSIS:

The objective of this Project is to improve training effectiveness and reduce training costs by focusing technology on individual training, team training and the maintenance of complex skills.

This program applies cognitive technology, virtual environments, artificial intelligence, neural networks, and simulation and modelling to assessing and improving human capabilities related to complex systems.

In FY92, plans include: (a) applying automated decision-making training tools that increase operator's ability to rapidly identify threat signals, (b) identifying critical ASW tactical decision skills that would benefit from increased graphic instructional technology, and (c) completing development of gaming computer based instruction and evaluate effectiveness in selected initial skills training.

In FY93, plans include: (a) developing prototype ASW tactics trainer and associated instructor training, (b) developing interactive course-ware training system for damage control and evaluate effect on at-sea conflagration exercises, and (c) modifying electronic warfare operator initial skills training systems' content with measures of effectiveness outcomes.

This continuing Project was transferred from 63720N in FY92.

RELATED ACTIVITIES:

Work in this Project is related to and fully coordinated with efforts in Program Elements 64722S, Education and Training Systems Development; 62233N, Mission Support Technology; 63007A, Human Factors, Personnel, and Training Advanced Technology; and 63227F, Personnel, Training, and Simulation Technology.

This continuing Project was transferred from 63720N in FY92.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) completing automated instructional development system and transitioning to Engineering Development, (b) completing Career Systems Training Design System for Electronic Warfare Operators and Operations Specialists, and (c) developing measures of effectiveness for surface combat operators and designed program for making curriculum changes.

PROJECT OVERVIEW

		92	93
PROJECT: W0542	AIR HUMAN FACTORS ENGINEERING	$ 1.0M	$ 1.1M
PE: 63707N	MANPOWER, PERSONNEL, AND TRAINING ADVANCED TECHNOLOGY		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVAL AIR DEVELOPMENT CENTER		

PROJECT SYNOPSIS:

The objective of this Project is to develop/demonstrate Human Factors Engineering (HFE) technology for a class of Intelligent Control systems that have broad application in airborne systems (being demonstrated under this Project), shipboard air support systems, and in the private sector: Earth resources monitoring; transportation; nuclear and conventional power plant control; and air traffic control.

This Project applies advanced HFE technology to improve human operator and maintainer effectiveness in all Navy airborne weapons systems. The goals of this Project include to: (1) enhance human performance, (2) reduce design-induced critical human performance errors, and (3) insert HFE technology into existing and new weapons systems.

In FY92, plans include: (a) completing F/A-18 Knowledgeable Observation Analysis-Linked Advisory System (KOALAS) demonstrations and transition to F-14D KOALAS engineering development, (b) demonstrating technology transfer potential to National Transportation Safety Board (NTSB) and Federal Aviation Administration, and (c) initiating KOALAS Multiplatform MSI demonstration Project.

In FY93, plans include: (a) transitioning to F/A-18 KOALAS engineering development, and (b) initiating development and demonstration of common KOALAS components for Multiplatform MSI network in F-14D, F/A-18, S-3, E2C (or E-X), and Unmanned Aerial Vehicle (UAV) Common Mission Planning and Control Station (SMPCS).

This continuing Project was transferred from 63701N in FY92.

RELATED ACTIVITIES:

Work in this Program Element is related to and fully coordinated with efforts in Program Elements 63216A, Synthetic Flight Simulator Development, and 63227F, Personnel, Training and Simulation Technology.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) demonstration of Knowledgeable Observation Analysis-Linked Advisory System (KOALAS) for multisensor integration (MSI) in F-14D engineering simulator; results demonstrated a 40% increase in lethal range of F-14 air-to-air weapon systems, (b) planning F/A-18 demonstration, and (c) developing pre-prototype KOALAS-based concept for airborne surveillance and antisubmarine warfare applications.

PROJECT OVERVIEW

		92	93
PROJECT: W1773	SIMULATION AND TRAINING DEVICES	$ 5.2M	$ 5.5M
PE: 63707N	MANPOWER, PERSONNEL, AND TRAINING ADVANCED TECHNOLOGY		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVAL TRAINING SYSTEMS CENTER		

PROJECT SYNOPSIS:

The objective of this Project is to improve mission effectiveness and safety by developing and demonstrating application of knowledge about human learning to engineering design of training systems.

This Project conducts proof-of-concept demonstrations of simulators and training technology to improve training and mission rehearsal capability.

In FY92, plans include: (a) demonstrating integrated Forward Deployable Aviation Simulator Technology (FAST) components, (b) demonstrating Organic Combat Systems Training Technology (OCSTT) for electronic warfare (EW) operator station, and (c) beginning experiment using battle force hardware and performance measurement criteria on Anti-Air Warfare (AAW) scenarios for embedded training.

In FY93, plans include: (a) completing Aircrew Coordination Training (ACT) demonstrations and transition to Engineering Development, (b) continuing FAST development/demonstrations and evaluate integrated FAST mission rehearsal device, and (c) beginning OCSTT EW ship-board developments and demonstrations.

This continuing Project was transferred from 63733N in FY92.

RELATED ACTIVITIES:

Work in this Project is related to and fully coordinated with efforts in Program Elements 63216A, Synthetic Flight Simulator Development, and 63227F, Personnel, Training and Simulation Technology.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) demonstrating three components of a Forward Deployable Aviation Simulator Technology (FAST) stike mission rehearsal device, (b) transitioning components of FAST to Universal Threat Simulator System (UTSS) joint program, (c) demonstrating modules of advanced Aircrew Coordination Training (ACT) and transitioning technology to NASA and FAA, (d) demonstrating Reduced Instruction Set Computer (RISC) system for embedded training in shipboard weapons systems, and (e) planning simulation network system using existing trainers.

PROGRAM ELEMENT OVERVIEW

PE: 63732M MARINE CORPS ADVANCED MANPOWER/TRAINING SYSTEMS

CONGRESSIONAL CATEGORY: MANPOWER & PERSONNEL

DoD ORGANIZATION: MC

FUNDING: FY92 $ 3.3M (FY93 PRESIDENT'S BUDGET)
FY93 $ 3.7M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to provide funds for the advanced development of systems and equipment to improve the manpower readiness of the Fleet Marine Force and to develop techniques and methods that advance the use and control of human resources in the Marine Corps.

The in-house organizations responsible for this program are the Navy Personnel Research and Development Center.

RELATED ACTIVITIES:

This Program Element adheres to tri-Service Reliance Agreements on Manpower and Personnel, with oversight and coordination provided by the Joint Directors of Laboratories. This program is related to all armed services' human resources management and forecasting efforts, including Program Elements 63707N, Manpower, Personnel, and Training Advanced Technology Development; 63007A, Human Factors, Personnel, and Training Advanced Technology; and 63227F, Personnel, Training, and Simulation Technology.

PAYOFF/UTILIZATION:

The payoff of this Program Element will be enhanced Fleet Marine Force readiness through improved use and control of human resources in the Marine Corps.

PROJECT OVERVIEW

		92	93
PROJECT: C0073	HUMAN RESOURCES MANAGEMENT AND FORECASTING (HRM&F)	$ 3.3M	$ 3.7M

PE: 63732M — MARINE CORPS ADVANCED MANPOWER/TRAINING SYSTEMS

CONGRESSIONAL CATEGORY: MANPOWER & PERSONNEL

DoD ORGANIZATION: MC

RESPONSIBLE ORGANIZATION: NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER

PROJECT SYNOPSIS:

The objectives of this Project are to: (a) develop systems and equipment to improve the manpower readiness of the Fleet Marine Force, and (b) develop techniques and methods that advance enlisted and officer occupational assignment, promotions and career track planning in the Marine Corps while end strength is reduced and force structure is changed.

In FY92, plans include: (a) completing Optical Digital Imaging (ODI) prototype of Temporary Disabled-Retirement List records to provide insight into benefits and problems with ODI in application, (b) completing Enlisted Planning System (EPS) Selective Reenlistment Bonus Module, and (c) conducting Joint Job Performance Measurement (JJPM) electronics repair test.

In FY93, plans include: (a) completing ODI prototype for fitness report measurement, (b) completing EPS user interface and Enlisted Bonus Module, and (c) designing test for JJPM clerical and administrative composite.

RELATED ACTIVITIES:

This Project adheres to tri-Service Reliance Agreements on Manpower and Personnel, with oversight and coordination provided by the Joint Directors of Laboratories.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) completion of the Woman Marine Model which allows planning for the numbers of women in the force structure, (b) completion of the Optical Digital Imaging (ODI) Strategic Plan to reduce records maintenance costs and expedite the process of preparing selection boards, and (c) completion and full operation of the Enlisted Planning System (EPS), Reenlistment Plan Module.

PROGRAM ELEMENT OVERVIEW

PE: 64703N — PERSONNEL, TRAINING, SIMULATION, AND HUMAN FACTORS

CONGRESSIONAL CATEGORY: MANPOWER & PERSONNEL

DoD ORGANIZATION: NAVY

FUNDING: FY92 $ 1.8M (FY93 PRESIDENT'S BUDGET)
FY93 $ 1.1M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to apply advanced technologies to operational requirements in manpower, personnel, training, and human factors.

This Program Element focuses on adaptive testing, math optimization, statistical/econometric forecasting, computer-based simulation, and decision support systems. This effort will improve the alignment of personnel inventory with authorizations, which will contribute to personnel readiness.

The in-house organization performing this work is the Navy Personnel Research and Development Center.

RELATED ACTIVITIES:

Program Element 62722A, Personnel and Training; Program Element 62703F, Personnel Utilization Technology; Program Element 63731A, Manpower and Personnel; Program Element 63707N, Manpower, Personneland Training Advanced Technology Development; Program Element 63732M, Marine Corps Advanced Manpower Training Systems; and Program Element 63704F, Manpower and Personnel Systems Technology.

PAYOFF/UTILIZATION:

The payoff of this Program Element is improved personnel readiness through improved alignment of personnel inventory with authorizations.

PROJECT OVERVIEW

		92	93
PROJECT: R1822	PERSONNEL, TRAINING, SIMULATION, AND HUMAN FACTORS	$ 1.8M	$ 1.1M

PE: 64703N — PERSONNEL, TRAINING, SIMULATION, AND HUMAN FACTORS

CONGRESSIONAL CATEGORY: MANPOWER & PERSONNEL

DoD ORGANIZATION: NAVY

RESPONSIBLE ORGANIZATION: NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER

PROJECT SYNOPSIS:

The objective of this Project is to apply advanced technologies to operational requirements in manpower, personnel, training, and human factors, transitioning into operation those projects demonstrated in advanced development.

Enabling technologies include adaptive testing, math optimization, statistical and econometric forecasting, computer-based simulation, and decision support systems.

In FY92, plans are to: (a) perform operational test and evaluation of CAT/ASVAB, (b) validate methods to determine enlisted personnel quality mix, (c) begin implementation of a prototype course authoring system, and (d) extend prototype enlisted assignment system to all ratings.

In FY93, plans are to: (a) refine enlisted cost/performance trade-off model to address required performance needs and job clustering, (b) begin integration of enlisted strength planning system, (c) begin engineering development of a MILSTAR navigation training aid, and (d) begin engineering development of prototype for the throttle and stick of the F/A-18 cockpit simulator.

This is a continuing Project.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) evaluation of computerized Armed Services Vocational Aptitude Battery (ASVAB) (Computer Adaptive Tasking [CAT]/ASVAB) test at four sites, (b) expanding sea/shore rotation analysis model to thirty-two ratings, and (c) completing prototype of recruiter selection tool.

PROGRAM ELEMENT OVERVIEW

PE: 64714N AIR WARFARE TRAINING DEVICES

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: NAVY

FUNDING: FY92 $ 0.8M (FY93 PRESIDENT'S BUDGET)
FY93 $ 2.1M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to develop a Universal Threat System for Simulators (UTSS) which is designed to provide current threat simulation to a wide range of aircrew simulators in three services, using a common threat module and standard threat database.

Historically, each different simulator has required development and maintenance of a separate threat generation system. Development of the standardized UTSS will provide more current threat representation and will eliminate redundant efforts and expense. UTSS will be incorporated on existing and future Navy aircrew Flight Trainers, Tactics Trainers and Weapons System Trainers.

UTSS is a Navy-led, tri-Service program through the Joint Technical Coordination Group - Training Systems Development.

RELATED ACTIVITIES:

Universal Threat System for Simulators is a tri-Service program.

PAYOFF/UTILIZATION:

The payoff for this Program Element is the development of a Universal Threat System for Simulators (UTSS).

PROJECT OVERVIEW

		92	93
PROJECT: W2124	AIR WARFARE TRAINING DEVELOPMENT	$ 0.8M	$ 2.1M
PE: 64714N	AIR WARFARE TRAINING DEVICES		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVAL AIR DEVELOPMENT CENTER		

PROJECT SYNOPSIS:

The Universal Threat System for Simulators (UTSS) is designed to provide current threat simulation to a wide range of aircrew simulators in three Services, using a common threat module and standard threat database.

In FY92, plans are to develop a common, validated electronic warfare threat environment technical database for use in aircrew flight trainers and weapons systems trainers.

In FY93, plans are to: (a) issue a Request for Proposal (RFP), (b) award the contract for UTSS prototype, and (c) build and test prototype UTSS module and database.

RELATED ACTIVITIES:

The UTSS is a tri-Service program.

PAYOFF/UTILIZATION:

The payoff for this Project is a Universal Threat System for Simulators to be used by all Services.

This Project is a new start for FY92.

PROGRAM ELEMENT OVERVIEW

PE: 64715N SURFACE WARFARE TRAINING DEVICES

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: NAVY

FUNDING: FY92 $ 10.7M (FY93 PRESIDENT'S BUDGET)
FY93 $ 3.1M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to improve Surface Warfare readiness and training.

This Program Element addresses the requirements of the Fleet and the Chief of Naval Education and Training for development of prototype surface warfare training devices to provide or improve training, operational readiness, efficiency and safety, and to reduce training time and costs.

The in-house organization responsible for this work is the Naval Training Systems Center.

RELATED ACTIVITIES:

Not applicable.

PAYOFF/UTILIZATION:

The payoffs of this Program Element include improved training, operational readiness, efficiency and safety, and reduced training time and costs.

The Landing Craft Air Cushion (LCAC) Operator Trainer project was completed in FY91.

PROJECT OVERVIEW

		92	93
PROJECT: S1427	SURFACE TACTICAL TEAM TRAINER	$10.7M	$ 3.1M
PE: 64715N	SURFACE WARFARE TRAINING DEVICES		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	NAVY		
RESPONSIBLE ORGANIZATION:	NAVAL TRAINING SYSTEMS CENTER		

PROJECT SYNOPSIS:

The objective of this Project is to develop a generic training system which will replace obsolete devices currently in operation.

The Project will provide team procedural and tactical training and evaluation in a multi-threat environment for conventional and tactical data-equipped ships. The devices developed in this project will have a direct impact on the Navy's ability to train for battle.

The 20A66 Anti-Submarine Warfare (ASW) Tactical Team Trainer will replace the ASW Coordinated Tactics Trainers (X14A6 and 14A6) built in the 1960s, and will provide multiple platform/multi-threat procedural, tactical, and decision-making training for single units up to battle group size. Each trainer will be composed of multiple surface ship, submarine, and aircraft "command centers".

Battle Force Tactical Training (BFTT) will consist of expanding the Combat Information Center (CIC) training concept by developing prototype surface ship combat system trainers and integrating these trainers into a shipboard training network.

In FY92, plans include: (a) finalizing and awarding the contract for embedded training capability of LINK II, (b) completing Software Critical Design review, in June 1992, and (c) continuing Hardware/Software integration and begin system testing in plant, and (d) completing 20A66 development.

In FY93, plans include: (a) developing and demonstrating BFTT pre-production shipboard systems, (b) developing and demonstrating BFTT scenario generation, control and display enhancements, and (c) providing systems engineering for definition of BFTT training network requirements.

This is a continuing Project.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) continuing 20A66 Lot I development with emphasis on software development and initial hardware interfacing, and (b) conducting Device 20A66 Software Critical Design.

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III-B-1: LISTING OF NAVY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
61153N						DEFENSE RESEARCH SCIENCES, SUBELEMENT 42: COGNITIVE AND NEURAL SCIENCES
RR04206	ONR	6.022	7.410	ET	6	PERSONNEL AND TRAINING
RR04208	ONR	3.009	3.180	MP	3	GROUP PSYCHOLOGY
RR04209	ONR	2.221	2.810	HF	4	ENGINEERING PSYCHOLOGY
		------	------			
		11.252	13.401			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 61153N :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	11.252	13.400

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(CONTINUATION)

III-B-1: LISTING OF NAVY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
62131M						MARINE CORPS LANDING FORCE TECHNOLOGY
CF31P14	NPRDC	0.550	0.550	MP	2	MARINE CORPS MANPOWER & TRAINING TECHNOLOGY
		0.551	0.551			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 62131M :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	0.550	0.550

(CONTINUED)

(CONTINUATION)

III-B-1: LISTING OF NAVY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
62233N						MISSION SUPPORT TECHNOLOGY: PERSONNEL, TRAINING AND SIMULATION
RM33D40	NTSC	1.885	1.895	ST	6A	TACTICAL DECISION-MAKING UNDER STRESS (TADMUS)
RM33D60	NOSC	1.785	1.895	HF	4B	TACTICAL DECISION-MAKING UNDER STRESS (TADMUS)
RM33M20	NPRDC	2.510	3.229	MP	2	MANPOWER AND PERSONNEL TECHNOLOGY
RM33T21	NTSC	0.938	1.174	ST	6F	INSTRUCTIONAL TECHNOLOGY
RM33T23	NPRDC	1.181	1.463	ET	6	TRAINING SYSTEMS TECHNOLOGY
RM33T24	NTSC	0.906	1.249	ST	6	SIMULATION TECHNOLOGY
RM33T25	NTSC	0.300	2.645	ST	6	VIRTUAL ENVIRONMENT TRAINING TECHNOLOGY
		9.506	13.551			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 62233N :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	9.505	13.550

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(CONTINUATION)

III-B-1: LISTING OF NAVY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
62234N						SYSTEMS SUPPORT TECHNOLOGY: HUMAN FACTORS TECHNOLOGY AREA
RS34H20	NOSC	3.199	3.865	HF	4	HUMAN FACTORS TECHNOLOGY
RS34H21	NPRDC	0.450	0.000	HF	5A	BIOPSYCHOMETRIC ASSESSMENT
		3.650	3.865			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 62234N :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	3.649	3.865

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III-B-1: LISTING OF NAVY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
63707N						MANPOWER, PERSONNEL, AND TRAINING ADVANCED TECHNOLOGY
R1770	NPRDC	1.000	3.453	MP	2	MANPOWER AND PERSONNEL SYSTEMS
R1771	NOSC	1.865	2.072	HF	4	SHIP HUMAN FACTORS ENGINEERING
R1772	NPRDC	4.089	6.325	ET	6	EDUCATION AND TRAINING DEVELOPMENT
W0542	NADC	0.989	1.118	HF	4	AIR HUMAN FACTORS ENGINEERING
W1773	NTSC	5.164	5.490	ST	6	SIMULATION AND TRAINING DEVICES
		13.108	18.458			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 63707N :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	13.107	18.458

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III-B-1: LISTING OF NAVY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
63732M						MARINE CORPS ADVANCED MANPOWER/TRAINING SYSTEMS
C0073	NPRDC	3.285	3.659	MP	1A	HUMAN RESOURCES MANAGEMENT AND FORECASTING (HRM&F)
		3.286	3.660			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 63732M :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	3.285	3.659

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(CONTINUATION)

III-B-1: LISTING OF NAVY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
64703N						PERSONNEL, TRAINING, SIMULATION, AND HUMAN FACTORS
R1822	NPRDC	1.790	1.137	MP	2	PERSONNEL, TRAINING, SIMULATION, AND HUMAN FACTORS
		1.790	1.137			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 64703N :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	1.790	1.137

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(CONTINUATION)

III-B-1: LISTING OF NAVY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
64714N						AIR WARFARE TRAINING DEVICES
W2124	NADC	0.827	2.119	ST	6A	AIR WARFARE TRAINING DEVELOPMENT
		0.828	2.119			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 64714N :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	0.827	2.119

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(CONTINUATION)

III-B-1: LISTING OF NAVY PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
64715N						SURFACE WARFARE TRAINING DEVICES
S1427	NTSC	10.646	3.100	ST	6	SURFACE TACTICAL TEAM TRAINER
		10.646	3.100			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 64715N :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	10.646	3.100

III.C. AIR FORCE PROGRAM ELEMENT AND PROJECT SYNOPSES

PROGRAM ELEMENT OVERVIEW

PE: 61102F DEFENSE RESEARCH SCIENCES

CONGRESSIONAL CATEGORY: HUMAN FACTORS

DoD ORGANIZATION: AF

FUNDING: FY92 $ 9.5M (FY93 PRESIDENT'S BUDGET)
FY93 $ 10.8M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objectives of the Training and Personnel Systems Technology (TPST) portion of this Program Element (PE) are to: (a) develop better ways to select individuals for jobs on the basis of their mental and physical skills; (b) train them to do those jobs well; and (c) design tasks and equipment to optimally match human capabilities and characteristics.

This Science and Technology Based PE, managed by the Air Force Office of Scientific Research (AFOSR), supports Air Force research efforts comprised of in-house investigations in Air Force laboratories and extramural activities in academia and industry. This PE funds broad-based scientific and engineering basic research in technologies critical to the Air Force mission and in the search for future critical technologies. These technologies include: (a) aerospace structures, (b) aerodynamics, (c) materials, (d) propulsion, (e) power, (f) electronics, (g) computer science, (h) directed energy, (i) conventional weapons, (j) life sciences, (k) terrestrial sciences, (l) atmospheric sciences, and (m) space sciences.

The in-house organization responsible for the TPST portion of the PE is the Armstrong Laboratory, Brooks Air Force Base, Texas.

PAYOFF/UTILIZATION:

The payoff of the TPST portion of this Program Element is to provide the knowledge required for Air Force personnel to skillfully perform difficult military tasks, and use complex equipment systems effectively.

PROJECT OVERVIEW

		92	93
PROJECT: 2313	HUMAN RESOURCES	$ 9.5M	$10.8M
PE: 61102F	DEFENSE RESEARCH SCIENCES		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objectives of this Project are to: (a) develop better ways to select individuals for jobs on the basis of their mental and physical skills; (b) train them to do those jobs well; and, (c) design tasks and equipment to optimally match human capabilities and characteristics.

Work in this Project is performed by Armstrong Laboratory, Brooks Air Force Base, Texas and selected universities and contractors.

In FY92, plans include: (a) performing spatial orientation research on interactions between the visual, auditory, and vestibular systems in order to understand the multi-sensory integration involved in synthesizing sensory inputs and making the appropriate orienting responses; and (b) beginning a new program in behavioral analysis to provide techniques to analyze human performance, in situations in which large numbers of factors are changing rapidly, to help predict performance in rapidly changing environments, and to assist in the design of workstations to provide for better man-machine interaction.

In FY93, plans include: (a) multi-sensory integration and control of responses to orienting stimuli will provide the basis for improved understanding of spatial orientation, and computational neuroscience research efforts will continue with an emphasis on modeling the information processing capabilities of the brain; and (b) a new research program will examine group decision-making processes in an effort to understand the psychological processes involved in communication fidelity and how best to structure command and control operations to improve the decision-making process of teams.

RELATED ACTIVITIES:

This Project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication, and with Program Elements: 0602202F, Human Systems Technology; 0603231, Crew Systems and Personnel Protection.

PAYOFF/UTILIZATION:

The payoffs from this Project provide the knowledge required for Air Force personnel to skillfully perform difficult military tasks and use complex equipment systmes effectively.

In FY91, specific accomplishments included developing and applying algorithms and software to measure fundamental neurocognitive processes such as attention, memory, language, and visuomotor function directly from brain waves.

PROGRAM ELEMENT OVERVIEW

PE: 62202F HUMAN SYSTEMS TECHNOLOGY

CONGRESSIONAL CATEGORY: HUMAN FACTORS

DoD ORGANIZATION: AF

FUNDING: FY92 $ 12.0M (FY93 PRESIDENT'S BUDGET)
FY93 $ 15.8M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Science and Technology Program Element is to focus on human aspects of the man interface with weapon systems.

Four key thrust areas are: (a) improvement of human performance in weapon system operations by refining crew selection, crew protection, and man-machine integration; (b) improvement of safety and protection of Air Force personnel from radiation, chemical, and mechanical forces; (c) use of our understanding of human factors to invent threats and countermeasures effective against enemy weapon system operators; and (d) development of defense measures for air base operations.

Funding indicated includes only the Training and Personnel Systems Technology (TPST) portion of this Program Element.

PAYOFF/UTILIZATION:

The payoffs for this research will improve combat effectiveness by expanding the parameters defining operationally safe performance limits. The payoffs for the TPST portion of this Program Element include: (a) protection of U.S. Air Force resources through the development of designs for visual camouflage, optical countermeasures, and techniques to defeat infrared and radar sensors; and (b) the development of methods to simulate man's interface with machines, and measure the changes in weapon effectiveness as a result of changes in man-machine coupling.

PROJECT OVERVIEW

		92	93
PROJECT: 06MD	HUMAN SYSTEMS DIVISION LABORATORY OPERATIONS	$ 4.3M	$ 5.1M
PE: 62202F	HUMAN SYSTEMS TECHNOLOGY		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objective of the Training and Personnel Systems Technology (TPST) portion of this Project is to support and complement all other Projects in this Program Element and provide for management, support and operation of the TPST portion of Armstrong Laboratory Operations. It provides for the pay and related costs of civilian physicians, scientists, engineers and support personnel, travel, transportation of equipment, rents, communications, utilities, laboratory supplies, unique equipment, and other related costs needed to conduct human systems technology research and exploratory development.

PAYOFF/UTILIZATION:

The payoff of the TPST portion of this Project includes the provision of resources to enable the human systems technology TPST research and development activities of the Armstrong Laboratory.

PROJECT OVERVIEW

		92	93
PROJECT: 6893	MANNED WEAPON SYSTEMS EFFECTIVENESS	$ 1.3M	$ 1.4M
PE: 62202F	HUMAN SYSTEMS TECHNOLOGY		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objective of this Project is to develop mission-effective techniques to deceive the operators of enemy air-to-ground and ground-to-air systems, and to investigate the effects of vision and motion on aircrew performance. Countermeasure designs and techniques are developed and delivered to Tactical Air Command.

This Project is managed by the Armstrong Laboratory, Brooks Air Force Base, Texas.

In FY92, plans include: (a) evaluating the design of Camouflage, Concealment, and Deception (CC&D) techniques for fixed facilities (e.g., hangars); and (b) fly the Space to Earth Direct-View Optical System on shuttle to evaluate ground force maneuver identification capability.

In FY93, plans include: (a) test of the "Ideal" CC&D visual pattern; (b) transfer the Spaceborne Direct-View Optical System to Space Command for space observation mission; and (c) preparation of visual function test device for flight on shuttle to investigate on-orbit changes to visual accommodation.

RELATED ACTIVITIES:

This Project has been coordinate through Project Reliance to harmonize efforts and eliminate duplication, and with Program Elements: 0602205F, Training/Simulation Technology; 0603227F, Advanced Simulator Technology; 0603231F, Crew Systems and Personnel Protection Technology; 0602204F, Aerospace Avionics; 0602702F, Command, Control, Communications; 0602201F, Aerospace Flight Dynamics; 0603205F, Flight Vehicle Technology; 0603245F, Advanced Fighter Technology Integration.

PAYOFF/UTILIZATION:

The payoffs of this Project are protection of U.S. Air Force resources through the development of designs for visual camouflage, optical countermeasures, and techniques to defeat infrared and radar sensors.

In FY91, specific accomplishments included: (a) development of designs for aircraft masking for Desert Shield aircraft parking areas using both solid color and patterned formats; (b) development and transition of a guide which provides specification data on effect of display time delays on effectiveness of flight simulation; and (c) development of a spaceborne direct view optical system flown on the shuttle.

PROJECT OVERVIEW

		92	93
PROJECT: 7184	MAN-MACHINE INTEGRATION TECHNOLOGY	$ 6.5M	$ 9.3M
PE: 62202F	HUMAN SYSTEMS TECHNOLOGY		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objective of this Project is to develop procedures and technologies to optimize the interface between Air Force personnel and the weapon systems they operate.

This Project will gather and analyze information about the characteristics of human operators to provide design data for system control and display development. This Project supports the Air Force contribution to the Joint DoD Advanced Technology Demonstrations for Precision Strike.

This Project is managed by the Armstrong Laboratory, Brooks Air Force Base, Texas.

In FY92, plans include: (a) integrating visual and audio display technologies as a precursor to Super Cockpit technology development for enhanced air-to-air and air-to-ground mission effectiveness; (b) develop cockpit lighting standard compatible with the C-17 Night Vision System to improve operator effectiveness; and (c) use new subjective and physiology-based workload metrics to quantify mental workload of aircrew in C-17 during Operational Test and Evaluation.

In FY93, plans include: (a) evaluating possible use of strategic force management simulation of command, control, communication, and intelligence for strategic bomber/tanker force execution; (b) developing a three-dimensional database of human heads with accurate shape and volume measurements for reliable helmet and head-mounted equipment sizing and

design; (c) developing technologies to evaluate a weapon system operator's situational awareness to quantitatively evaluate crew system designs; and (d) begin developing a minature color image source for helmet-mounted displays to improve man-machine interface in the precision strike role.

RELATED ACTIVITIES:

Related Program Elements: 0602205F, Training/Simulation Technology; 0603227F, Advanced Simulator Technology; 0603231F, Crew Systems and Personnel Protection Technology; 0602204F, Aerospace Avionics; 0602702F, Command, Control, Communications; 0602201F, Aerospace Flight Dynamics; 0603205F, Flight Vehicle Technology; 0603245F, Advance Fighter Technology Integration.

PAYOFF/UTILIZATION:

Payoffs for this Project include developing methods to: (a) simulate man's interface with machines; and (b) measure the changes in man-machine coupling.

In FY91, accomplishments included: (a) developing Night Vision Goggle (NVG) resolution charts to aid aviator pre-flight adjustment of NVGs, with over 300 shipped to Desert Storm; and (b) evaluation of the Agile Eye Helmet-Mounted Display for improved pilot situational and combat awareness.

PROGRAM ELEMENT OVERVIEW

PE: 62205F — PERSONNEL, TRAINING, AND SIMULATION

CONGRESSIONAL CATEGORY:
EDUCATION & TRAINING
HUMAN FACTORS
SIMULATION & TRAINING DEVICES
MANPOWER & PERSONNEL

DoD ORGANIZATION: AF

FUNDING:
FY92 $ 29.7M (FY93 PRESIDENT'S BUDGET)
FY93 $ 32.8M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Science and Technology Program Element is to focus on: (a) reducing the manpower requirements needed to operate and support weapon systems; and, (c) improving the effectiveness of the operators and maintainers.

Research efforts for this Program Element consist of: (a) Training Development and Assessment Technology; (b) Aircrew Training Technology; (c) Logistics and Maintenance Technology; (d) Command and Control Training; and, (e) Force Acquisition and Distribution Systems.

The in-house performing organization responsible for this program is the Armstrong Laboratory, Human Resources Directorate, located at Brooks Air Force Base (AFB), Texas, Wright-Patterson AFB, Ohio, amd Williams AFB, Arizona.

PAYOFF/UTILIZATION:

The payoffs of this Program Element include: (a) increased operational readiness by developing technologies to enable more effective classification, assignment, training and retention of personnel; (b) minimization of the manpower and equipment necessary to conduct maintenance; and, (c) increased weapons system supportability and improved wartime logistics planning.

PROJECT OVERVIEW

		92	93
PROJECT: 06HT-ET	LABORATORY SUPPORT	$ 6.5M	$ 7.4M
PE: 62205F	PERSONNEL, TRAINING, AND SIMULATION		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objective of this Project is to fund the operation of the Armstrong Laboratory, Human Resources Directorate (AL/HRD), located at Brooks Air Force Base (AFB), Texas, Wright-Patterson AFB, Ohio, and Williams AFB, Arizona. It provides for: (a) pay and related costs of civilian scientists, engineers, and support personnel; (b) transportation of equipment; (c) rents; (d) communications and utilities costs; (e) reproduction services; and (f) procurement of supplies, equipment, and contractor support services for these facilities.

This project supports and complements all Education and Training Projects within Program Element 62205F and is a continuing program.

PAYOFF/UTILIZATION:

The payoff of this Project includes enabling the many and varied Education and Training research tasks of Armstrong Laboratory, Human Resources Directorate, to be accomplished by handling the support functions of the lab.

PROJECT OVERVIEW

		92	93
PROJECT: 06HT-HF	LABORATORY SUPPORT	$ 2.1M	$ 2.7M
PE: 62205F	PERSONNEL, TRAINING, AND SIMULATION		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objective of this Project is to fund the operation of the Armstrong Laboratory, Human Resources Directorate (AL/HRD) at Brooks Air Force Base (AFB), Texas, Wright-Patterson AFB, Ohio, and Williams AFB, Arizona. It provides for: (a) pay and related costs of civilian scientists, engineers, and support personnel; (b) transportation of equipment; (c) rents; (d) communications and utilities costs; (e) reproduction services; and (f) procurement of supplies, equipment, and contractor support services for these facilities.

This Project supports and complements all Human Factors Projects within Program Element 62205F and is a continuing program.

PAYOFF/UTILIZATION:

The payoff of this Project includes enabling the many and varied Human Factors research tasks of Armstrong Laboratory, Human Resources Directorate, to be accomplished by handling the support functions of the lab.

PROJECT OVERVIEW

		92	93
PROJECT: 06HT-MP	LABORATORY SUPPORT	$ 1.9M	$ 1.9M
PE: 62205F	PERSONNEL, TRAINING, AND SIMULATION		
CONGRESSIONAL CATEGORY:	MANPOWER & PERSONNEL		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objective of this Project is to fund the operation of the Armstrong Laboratory, Human Resources Directorate (AL/HRD), located at Brooks Air Force Base (AFB), Texas, Wright-Patterson AFB, Ohio, and Williams AFB, Arizona. It provides for: (a) pay and related costs of civilian scientists, engineers, and support personnel; (b) transportation of equipment; (c) rents; (d) communications and utilities costs; (e) reproduction services; and (f) procurement of supplies, equipment, and contractor support services for these facilities.

This Project supports and complements all Manpower and Personnel Projects within Program Element 62205F and is a continuing program.

PAYOFF/UTILIZATION:

The payoff of this Project includes enabling the many and varied Manpower and Personnel research tasks of Armstrong Laboratory, Human Resources Directorate, to be accomplished by handling the support functions of the lab.

PROJECT OVERVIEW

		92	93
PROJECT: 1121	TRAINING DEVELOPMENT AND ASSESSMENT TECHNOLOGY	$ 3.6M	$ 3.9M
PE: 62205F	PERSONNEL, TRAINING, AND SIMULATION		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objectives of this Project are to: (a) develop technology to accelerate learning, increase skill/knowledge retention, and improve job performance; and, (b) develop cost-effective methods for designing, delivering, and evaluating training.

These objectives are based on the increased utilization of advanced technology, changes in the overall qualifications of the recruit pool, and budget constraints which pose new challenges to the already demanding task of training Air Force recruits.

This Project is managed by the Armstrong Laboratory (AL), Brooks Air Force Base, Texas. Work is performed by AL and by various contrators.

In FY92, plans include: (a) developing experimental training planning and evaluation technologies; (b) developing procedures for defining fundamental job skill requirements; (c) applying hypermedia technologies to computer-based training authoring systems; (d) investigating the instructional application of advanced human-machine interface technologies in intelligent tutoring systems; and, (e) developing experimental training effectiveness and efficiency models.

In FY93, plans include: (a) developing methods to identify core Air Force technical training needs; (b) developing methods to integrate training planning and evaluation technologies into the instruction design process; (c) developing preliminary diagnostic procedures for identifying fundamental skill deficiencies; (d) applying advanced human-machine interface technologies to intelligent tutoring systems; (e) developing instructional

methodologies for a desktop logistics command and control trainer; and, (f) initiating development of skill decay and transfer of learning models for training evaluation.

RELATED ACTIVITIES:

Related Program Elements: 0603227F, Personnel, Training, and Simulation Technology; 0604243F, Manpower, Personnel, and Training Development; 0602233N, Mission Support Technology: Personnel, Training, and Simulation Technology Area; 0602785A, Manpower, Personnel, and Training Technology.

This Project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. The Air Force has formal agreements with the Army and the Navy to share development of computer-based training technologies.

PAYOFF/UTILIZATION:

The payoffs of this Project include: (a) accelerated learning, increased skill/knowledge retention, and improved job performance; and, (b) developing cost-effective methods for designing, delivering, and evaluating training.

In FY91, specific accomplishments included: (a) determining the effectiveness of using neural networks to train and control intelligent tutors; and, (b) developing guidelines for engineering, authoring, and selection of effective courseware for computer-based training.

PROJECT OVERVIEW

		92	93
PROJECT: 1123	AIRCREW TRAINING TECHNOLOGY	$ 8.2M	$ 8.9M
PE: 62205F	PERSONNEL, TRAINING, AND SIMULATION		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objectives of this Project are to: (a) develop new methods and techniques for aircrew training by investigating the entire spectrum of aircrew training to determine the best ways of designing, delivering and assessing ground-based and aircraft training; and (b) develop flight simulator component technologies to reduce the cost of future aircrew training systems and to provide new capabilities for realistic combat training.

This Project is managed by the Armstrong Laboratory (AL), Williams Air Force Base, Arizona. Work is performed by Armstrong Laboratory and by various contractors.

In FY92, plans include: (a) developing designs for visual system requirements and evaluation, (b) completing a C-130 Aircrfew Training System Cost-Effectiveness Analysis, (c) developing a prototype of a color modeling workstation; (d) evaluating expert systems for air combat maneuvering; and (e) demonstrating a debriefing system based on virtual reality.

In FY93, plans include: (a) developing a total training system evaluation model; (b) developing training system guidelines for formal school training; (c) demonstrating a Joint-Service Air-to-Air Network; and (d) developing expert system models for air combat maneuvering.

RELATED ACTIVITIES:

Related Program Elements: 0603227F, Personnel, Training, and Simulation Technology; 0604227F, Flight Simulator Development; 0602233N, Mission Support Technology: Personnel, Training, and Simulation Technology Area; 0602727A, Non-System Training Devices Technology.

This Project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. The Air Force has formal agreements with the Army for visual display and advanced computer image generation technology. The Navy has a liasion office at Armstrong Laboratory.

PAYOFF/UTILIZATION:

The payoffs of this Project include: (a) new methods and techniques for aircrew training; and, (b) better ways of designing, delivery and assessing ground-based and aircraft training.

In FY91, specific accomplishments included: (a) developing a model incorporating visual training effectiveness data to optimize simulator fidelity variables for aircrew training and mission rehearsal; and (b) incorporating the addition of an air component to long-distance simulator networking to demonstrate simulator interconnection for a joint maneuver training exercise.

PROJECT OVERVIEW

		92	93
PROJECT: 1710	LOGISTICS AND MAINTENANCE TECHNOLOGY	$ 3.9M	$ 4.7M
PE: 62205F	PERSONNEL, TRAINING, AND SIMULATION		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objectives of this Project are to: (a) develop new technologies to improve combat and peacetime operations logistics support; (b) develop improved logistics planning and assessment models for realistic computation of wartime logistics requirements and capabilities; (c) develop methods to identify trade-offs to minimize the manpower and equipment necessary to conduct aircraft maintenance in dispersed locations; and, (d) develop software tools enabling the design-in of improved reliability, maintainability, supportability, and man-machine interfaces to reduce lifecycle costs.

This Project addresses the fact that conventional maintenance methods, practices, and procedures must be modernized to adequately support future complex weapon systems.

This Project is managed by the Armstrong Laboratory (AL), Wright-Patterson Air Force Base, Ohio. This work is performed by AL and by selected contractors.

In FY92, plans include: (a) developing a database for estimating the time required to perform certain maintenance tasks, to be used to minimize costs of Manpower, Personnel, and Training (MPT) during the design process; (b) developing a logistics simulation object database to improve information storage, retrieval, update, and display; and, (c) developing human performance process models that replicate human behavior (models will enhance effective decision-making during conditions in which needed information is unavailable).

In FY93, plans include: (a) developing a logistics simulation model environment for use by logistics analysts at all component levels; (b) developing an operability test-bed that allows for a wide variety of human and hardware/software system combinations to be tested early in the design phase; and (c) developing a modeling tool to evaluate physical components, information flows, and human/machine activities in an information-intensive, time-critical system environment.

RELATED ACTIVITIES:

Related Program Elements: 0603106F, Logistics Systems Technology; 0602716A, Human Factors Engineering Technology Development; 0602234N, Mission Support Technology: Human Factors Technology Area.

This Project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

PAYOFF/UTILIZATION:

The payoffs of this Project are improved the logistics support of combat units through modernization of maintenance methods, practices, and procedures.

In FY91, specific accomplishments included: (a) development of advanced models to predict the impact of operational scenarios on combat logistics requirements; and (b) development and transition of a quick-response, computer-based training system for PACAF command and control battle staffs (this system was used in Desert Storm).

PROJECT OVERVIEW

		92	93
PROJECT: 7719	FORCE ACQUISITION AND DISTRIBUTION SYSTEM	$ 3.5M	$ 3.3M
PE: 62205F	PERSONNEL, TRAINING, AND SIMULATION		
CONGRESSIONAL CATEGORY:	MANPOWER & PERSONNEL		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objectives of this Project are to develop: (a) personnel qualification and aptitude measurement methods; (b) job specification standards; and (c) manpower and personnel models.

This Project is managed by Armstrong Laboratory (AL), Brooks Air Force Base, Texas. The work is performed by AL and by various contractor.

In FY92, plans include: (a) developing a specialty structuring system model to conduct task-level tradeoffs for different skills; (b) beginning development of advanced transferability skills models for manpower, personnel, and training application; (c) delivering guidelines for optimizing decisions on personnel retraining decisions; and, (d) delivering the Processing and Classification of Enlistees-Person Job Match (PACE-PJM) System to the Air Training Command (ATC) for optimal classification of trainees to jobs.

RELATED ACTIVITIES:

This Project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

Related Program Elements: 0603227F, Personnel, Training, and Simulation Technology; 0604243F, Manpower, Personnel, and Training Development; 0602233N, Mission Support Technology: Personnel, Training, and Simulation Technology Area; 0602785A, Manpower, Personnel, and Training Technology.

PAYOFF/UTILIZATION:

Payoffs for this Project include providing methods and tools for optimal selection, classification, and assignment of personnel.

In FY91, specific accomplishments included: (a) delivering pilot selection models to improve trainee quality; and (b) delivering a pilot classification model to improve bomber/fighter and tanker/transportation classification decisions.

PROGRAM ELEMENT OVERVIEW

PE: 63106F LOGISTICS SYSTEMS TECHNOLOGY

CONGRESSIONAL CATEGORY: HUMAN FACTORS

DoD ORGANIZATION: AF

FUNDING: FY92 $ 6.2M (FY93 PRESIDENT'S BUDGET)
FY93 $ 15.0M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Science and Technology Progrm Element is to develop technology to reduce the cost and improve the design, acquisition, and supportability of current and future weapons systems.

This Program Element will: (a) improve the way maintenance considerations are designed into weapons systems, (b) make engineering, product support, and maintenance data electronically available throughout the lifetime of weapons systems, (c) provide more realistic simulation-based logistics planning and combat capability assessment models, (d) provide critical risk-reduction technology, and (e) accelerate development and implementation of near-term logistics supportability requirements.

The new focus of this Program Element also includes test and diagnostic technologies. Sample savings from application of this technology include: (a) 43,000 maintenance manhours per year for just the five worst ("bad actors") electrical components on the F-16, (b) 23,000 manhours per year at the Air Logistics Centers (ALC) by reducing by up to 80% false removal of components that retest satisfactory, and (c) elimination of 2 fork-lift pallets of paper technical orders for each 24 ship F-16 deployment.

All Computer Aided Logistics Support (CALS) related technology has been removed from this Program Element. Additional logistics-related technology has been added to the PE to greatly expand the program technical scope. Increased scope is primarily in Project 2745, Logistics for Combat Weapon Systems Maintenance and Support.

Project 2950, Improved Logistics and Maintenance Performance, has been reoriented and refocused to include a broad-based set of technologies to improve logistics and maintenance support.

RELATED ACTIVITIES:

The Projects within this Program Element have been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

PAYOFF/UTILIZATION:

The payoff of this Program Element are a reduction in cost and improvement in design, acquisition, and supportability of current and future weapon systems.

PROJECT OVERVIEW

		92	93
PROJECT: 2745	LOGISTICS FOR COMBAT WEAPON SYSTEM MAINTENANCE AND SUPPORT	$ 0.5M	$ 3.5M
PE: 63106F	LOGISTICS SYSTEMS TECHNOLOGY		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objective of this Project has been expanded to include additional logistics-related technologies to develop, demonstrate, and transition technology to improve the performance and supportability of Air Force weapons systems in both peacetime and deployed wartime environments.

This technology reduces the time now required to get new logistics support tools and methods into field applications. Products developed also show design engineers, managers, users, and maintainers the impacts of proposed system modifications and materials on field and depot system supportability and operation prior to acquisition.

In FY92, plans are to: (a) continue assessment of logistics supportability for Composite Wings, and (b) define system repair/modification process at a selected Air Logistics Center.

In FY93, plans are to: (a) conduct integrated product design review of proposed system modification to identify possible impacts on field maintainability and supportability, (b) develop and demonstrate methods for assessment and repair of battle/accident damaged aircraft when away from full intermediate maintenance facilities, (c) investigate suitable alternatives to Halon 1301 to ensure engine nacelle fire suppression capability will exist after mandated phase-out of Halons, and (d) identify and demonstrate technologies for parachute extraction/jettison device to improve aircrew and aircraft supportability and safety.

RELATED ACTIVITIES:

This Project is fully coordinated with Project Reliance and Program Elements 62205F, Personnel, Training and Simulation; 63007A, Human Factors, Personnel and Training; and 63253F, Advanced Avionics Integration.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included the initiation of front-end analysis to assess logistics supportability implications of Composite Wings.

PROJECT OVERVIEW

		92	93
PROJECT: 2940	TECHNOLOGY FOR DESIGN AND MAINTENANCE	$ 5.7M	$ 7.9M

PE: 63106F — LOGISTICS SYSTEMS TECHNOLOGY

CONGRESSIONAL CATEGORY: HUMAN FACTORS

DoD ORGANIZATION: AF

RESPONSIBLE ORGANIZATION: ARMSTRONG LABORATORY

PROJECT SYNOPSIS:

The objectives of this Project are to develop new technologies that will enable design, procurement, repair, and modification of more supportable and affordable weapon systems and permit integration of design trade-off decisions involving survivability, producibility, and supportability.

In FY92, plans are to: (a) refine computer model of maintenance technicians to include estimation of maintenance times, (b) deliver integrated data exchange and control of paperless design of weapon system modifications from demonstration to routine operation, greatly reducing ALC costs, and (c) deliver better, lower cost methods to model information esential to weapons system design and operation, allowing paperless system support.

In FY93, plans are to: (a) develop technology to help ALCs manage digital technical data during modification and repair of existing systems, and (b) continue to develop and demonstrate methods to permit system capability acquisition trade-offs using accurate and easy-to-use analysis tools.

RELATED ACTIVITIES:

This Project has been fully coordinated through Project Reliance and Program Elements 62205F, Personnel, Training and Simulation; 64740F, Computer Resource Management Technology; and 708011F, Manufacturing Technology.

PAYOFF/UTILIZATION:

The payoffs of this Project include a 50-to-1 return on investment by preventing costly manufacturing rework and design flaws through better initial design, fifty percent reductions in retrofit costs for modifications, and large reductions in ALC support costs.

In FY91, specific accomplisments included: (a) expansion of logistics center access to technical databases and digitized design tools through a field demonstration, (b) demonstration of a system for improved reliability and maintainability in the design of weapon systems, and (c) demonstration of preliminary computer tools to capture and trace user system requirements in design, resulting in more affordable weapons systems that meet users needs.

PROJECT OVERVIEW

		92	93
PROJECT: 2950	IMPROVED LOGISTICS AND MAINTENANCE PERFORMANCE	$ 0.0M	$ 3.6M
PE: 63106F	LOGISTICS SYSTEMS TECHNOLOGY		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

This Project has been reoriented to exclude CALS related technologies.

The objectives of this Project now are to develop technologies that will improve logistics and maintenance support including: (a) development and demonstration of critical risk-reduction technology essential to field and depot maintenance operations, (b) implementation of near-term logistics technology to shorten the time between user requirement and usable product delivery, and (c) development and field demonstration of technologies for the flight-line maintenance technician. This will allow replacement of the paper-based technical order system and integration of all information required by the technician to inspect, troubleshoot, repair, and report through use of a hand-held computer maintenance aid.

This Project is coordinated with all three Services, and products are being applied to many current and future systems, such as the F-16, F/A-18, B-2, JSTARS, F-22, and the Army M1A1 tank. Commercial industry is intersted in applying these technologies to improve maintenance and support of airliners and automobiles.

In FY92 funding for the IMIS program was moved by Congressional action to the OSD Computer-Aided Logistics Support (CALS) System, and IMIS progress will be reported by OSD.

In FY93 plans are to: (a) conduct a base-level field test on the F-16 demonstrating and validating integrated maintenance technology, (b) conduct analysis to determine the payoff of integrated maintenance information for on-the-job training of maintenance technicians, and (c) complete validated specifications for procurement of integrated maintenance components.

RELATED ACTIVITIES:

This Project is coordinated through the Project Reliance process and Program Elements 62205F, Personnel, Training, and Simulation; 27219F, Advanced Tactical Fighter; 64708F, Generic Integrated Maintenance Diagnostics Systems, and 63721N, Integrated Diagnostic Support.

PAYOFF/UTILIZATION:

Specific accomplishments for FY91 included: (a) accomplishment of Preliminary Design Review for Integrated Maintenance Information System (IMIS) field demonstration, and (b) provision of refined draft specifications for procurement of Type C data to Air Force Logistics Command (AFLC), other DoD agencies, and industry.

PROGRAM ELEMENT OVERVIEW

PE: 63227F — PERSONNEL, TRAINING, AND SIMULATION TECHNOLOGY

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES
EDUCATION & TRAINING
MANPOWER & PERSONNEL

DoD ORGANIZATION: AF

FUNDING: FY92 $ 9.4M (FY93 PRESIDENT'S BUDGET)
FY93 $ 9.6M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to demonstrate advanced concepts to improve operational readiness and combat training through the development of manpower, personnel, and training (MPT) technologies including: (a) systems to write computer-based training programs, (b) a decision aiding system to optimize personnel use, (c) job performance measurement technologies, (d) analytical tools to improve consideration of manpower, personnel, and training in the system design process, and (e) realistic aircrew combat training.

This Program is managed by the Armstrong Laboratory, Brooks, AFB, TX.

RELATED ACTIVITIES:

The Projects within this Program Element have been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

PAYOFF/UTILIZATION:

The payoffs of this Program Element are improved operational readiness through the development of manpower, personnel, and training technologies.

PROJECT OVERVIEW

		92	93
PROJECT: 2743	MULTI-SHIP TRAINING RESEARCH AND DEVELOPMENT	$ 5.6M	$ 5.9M

PE: 63227F — PERSONNEL, TRAINING, AND SIMULATION TECHNOLOGY

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES

DoD ORGANIZATION: AF

RESPONSIBLE ORGANIZATION: ARMSTRONG LABORATORY

PROJECT SYNOPSIS:

The objective of this Project is to develop, demonstrate, and evaluate simulator-based air combat training as an affordable, effective, and realistic adjunct to flight-based training.

This Project provides a testbed for examining aircrew skills, cognitive functions, behaviors, and instructional strategies that contribute to success in combat. Different levels of simulator fidelity will provide data to determine the most cost-effective levels for combat training. Long distance networking will enable joint-Service/combined arms training.

In FY92, plans are to: (a) demonstrate low-cost color Liquid Crystal Display (LCD) helmet-mounted display technology for squadron-level training, (b) demonstrate eye tracking technology that can be retrofitted to existing simulators to provide high fidelity visual systems for air-to-ground training, and (c) demonstrate networked combat engagement trainers for low-cost, high fidelity air-to-air training.

In FY93, plans are to: (a) perform simulator transfer of training for beyond visual range air combat to validate simulator use in that role, (b) perform training system technology demonstration for air-to-ground training, and (c) demonstrate utility of a network of low-cost aircraft simulation trainers at unit level.

RELATED ACTIVITIES:

This Project has been coordinated through the Project Reliance process and Program Elements 62205F, Personnel, Training, and Simulation, and 64227F, Flight Simulator Development. In addition, the Air Force has formal agreements with the Army for visual display and computer image generation technology, and the Navy has a liaison office at Armstrong Laboratory.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) successfully combining eye tracking with a Fiber Optic Helmet-Mounted Display (FOHMD) to provide a high resolution visual system for air-to-ground training, and (b) demonstration of a low-cost helmet-mounted display (HMD) to improve squadron level training.

PROJECT OVERVIEW

		92	93
PROJECT: 2922	MANPOWER AND FORCE MANAGEMENT	$ 1.7M	$ 1.2M
PE: 63227F	PERSONNEL, TRAINING, AND SIMULATION TECHNOLOGY		
CONGRESSIONAL CATEGORY:	MANPOWER & PERSONNEL		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

Manpower, personnel, and training (MPT) factors are a major player in the day-to-day productivity of the Air Force as well as the ability to operate, maintain, and support mission-capable weapon systems.

The objective of this Project is to develop technology to enhance the consideration of MPT early in the weapon system design and acquisition process to ensure these MPT requirements are supportable, and to enable trade-offs to accommodate MPT limitations and costs.

In FY92, plans are to: (a) establish measures of effectiveness for use in evaluating the effectiveness of MPT tools and techniques, (b) complete Phase III of the Leadership Effectiveness Assessment Profile (LEAP): validation and analysis, and (c) establish linkage of MPT databases to integrate MPT information from different sources needed to make MPT decisions.

In FY93, plans are to: (a) transfer procedures for collecting task-level job knowledge requirements to USAF Occupational Measurement Squadron for routine operational collection of data for use by training planners, (b) complete productive capacity model for linking enlistment standards to job performance for Air Force Military Personnel Center to determine optimal enlistment standards, and (c) develop technology for automated job inventories to improve efficiency and cost-effectiveness of collecting occupational data.

RELATED ACTIVITIES:

This Project has been coordinated through the Project Reliance process and Program Elements 62205F, Personnel, Training, and Simulation, and 64243, Manpower, Personnel, and Training Development.

PAYOFF/UTILIZATION:

The payoff of this Project is enhanced consideration of manpower, personnel, and training factors early in the weapon systems acquisition cycle.

In FY91, specific accomplishments included: (a) building a manpower requirement simulation model for use with emerging weapon systems, and (b) determination of the relationship of Air Force enlisted standards to on-the-job performance for eight Air Force specialists to assure the validity of standards.

PROJECT OVERVIEW

		92	93
PROJECT: 2949	ADVANCED TRAINING TECHNOLOGIES	$ 2.1M	$ 2.5M

PE: 63227F — PERSONNEL, TRAINING, AND SIMULATION TECHNOLOGY

CONGRESSIONAL CATEGORY: EDUCATION & TRAINING

DoD ORGANIZATION: AF

RESPONSIBLE ORGANIZATION: ARMSTRONG LABORATORY

PROJECT SYNOPSIS:

Opportunities exist for improved job performance and readiness through the development and use of new training technologies.

The objectives of this Project are to develop and demonstrate software to enable AF training developers to rapidly and inexpensively build Intelligent Computer-Assisted Training (ICAT) systems. ICAT systems continually interact with students to develop effective individualized training.

In FY92, plans are to: (a) complete the first version of the Rapid Intelligent Tutoring System (ITS) Development Systems (RIDES) software for intelligent tutoring systems, (b) initiate evaluation of the Avionics Job Family Tutor, (c) initiate evaluation of RIDES, and (d) complete Mechanical Job Family Tutor.

In FY93, plans are to: (a) complete evaluation of Avionics Job Family Tutor, (b) initiate evaluation of Mechanical Job Family Tutor, (c) complete development of the RIDES, and initiate field demonstration, test, and evaluation, including RIDES software demonstration, (d) initiate development of technology to support training planning decisions to enable training planners to make optimal choices in curriculum development, and (e) develop advanced data collection methodologies for training planning systems for efficient, routine collection of data used in making training planning decisions.

RELATED ACTIVITIES:

This Project has been coordinated through the Project Reliance process and Program Elements 62205F, Personnel, Training, and Simulation, and 64232F, Manpower, Personnel, and Training Development.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) determination of hardware and software requirements for cost effective and user friendly Intelligent Computer-Assisted Training (ICAT) development, (b) determination of which instructional strategies provide the best training in ICAT applications, and (c) demonstration of microcomputer authoring techniques for rapid development of intelligent tutors.

PROGRAM ELEMENT OVERVIEW

PE: 63231F CREW SYSTEMS AND PERSONNEL PROTECTION TECHNOLOGY

CONGRESSIONAL CATEGORY: HUMAN FACTORS

DoD ORGANIZATION: AF

FUNDING: FY92 $ 9.9M (FY93 PRESIDENT'S BUDGET)
FY93 $ 8.7M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to conduct advanced development of concepts, components, and systems to protect and enhance the performance of Air Force personnel in operational environments.

Specific projects advance and integrate human factors technologies into cockpit, life support, and aircrew equipment designs. Demonstrated technologies will feed into engineering and manufacturing development programs to address over fifteen documented needs from USAF commands which require these specific warfighting capabilities.

The in-house organizations responsible for this program are the Armstrong Laboratory, the Joint Cockpit Office, the Defense Logistics Agency, and the Wright Laboratory.

RELATED ACTIVITIES:

Related activities are: 62202F, Human Systems Technology; 63205F, Aerospace Vehicle Technology; 64706F, Life Support Systems; 63269F, National Aero-Space Plane; and 63790D, NATO Cooperative R&D.

Project 2829: Laboratory Joint Cockpit Office administers Armstrong Laboratory and Wright Laboratory advanced programs in cockpit technology; coordination occurs through a Crew Station Working Group (CSWG) within Air Force Systems Command (AFSC). Also through a Joint Aeronautical Commander's Group Committee, and DoD Human Factors Engineering Technical Group.

Project 2992: military space crew activities coordinated through Military/NASA Space Technology Interdependency Group.

Project 3257: coordination occurs with CSWG within AFSC; joint development with the Navy on helmet-mounted displays and integrated night vision goggles.

These projects have been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

PAYOFF/UTILIZATION:

The payoffs of this Program Element include advances in concepts, components, and systems to protect Air Force personnel in operational environments.

PROJECT OVERVIEW

		92	93
PROJECT: 2829	CREW-CENTERED COCKPIT DESIGN	$ 4.3M	$ 4.2M
PE: 63231F	CREW SYSTEMS AND PERSONNEL PROTECTION TECHNOLOGY		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	HUMAN SYSTEMS DIVISION		

PROJECT SYNOPSIS:

The objective of this Project is to develop a crew system design and development process which will address the human factors requirements of the crew station early in the aircraft acquisition cycle. This will be a "traceable" process so that future weapon system designers will understand the rationale behind design decisions; e.g., location of flight instruments. Tools developed will predict pilot performance and mission success as functions of cockpit design to quantify human/system trade-offs.

Past and present cockpits were developed to meet the constraints of the aircraft. Decisions on where to place flight instruments and controls were often based on item's size, weight, or traditional location. Information or tradeoff studies supporting these decisions usually were not saved.

In FY92, plans are to: (a) initiate development of an in-flight cockpit evaluation system to measure pilot workload and performance, and (b) install complete computer-based (hardware and software) cockpit design support system to demonstrate and validate cockpit design process and design support system procedures and techniques used to design, develop, and modify new and existing cockpits.

In FY93, plans are to: (a) demonstrate cockpit design process for tactical and transport aircraft to develop cockpits designed to meet the requirements of the aircraft's mission, and (b) begin evaluations for upgrades to current cockpit designs to develop a system for measuring cockpit effectiveness in terms of mission, safety, and pilot awareness.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) completing the formal Crew System Design Process to help designers assess cockpit requirements, and (b) installing the computer-aided engineering/computer-aided design analysis software at the DoD Crew Systems Information Center to provide demonstrations and training on tools developed for use in cockpit design and modification.

PROJECT OVERVIEW

		92	93
PROJECT: 2992	SPACE CREW ENHANCEMENT (SPACE)	$ 0.8M	$ 0.0M
PE: 63231F	CREW SYSTEMS AND PERSONNEL PROTECTION TECHNOLOGY		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	ARMSTRONG LABORATORY		

PROJECT SYNOPSIS:

The objective of this Project is to identify and develop specialized crew protection and man-machine integration needed to support possible military missions from space.

The goal is to develop the database required to identify possible mission scenarios, crew capabilities, and military unique crew requirements.

In FY92, plans are to: (a) initiate development on ensemble subsystems (gloves and joints) for transatmospheric missions, and (b) transfer remaining transatmospheric and high altitude protection suit technology to Project 2830, Advanced Life Support; work will support existing studies to improve personal protection.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included evaluating ground-target acquisition and tracking system for the space shuttle to assess man's ability to track ground targets from low earth orbit.

PROJECT OVERVIEW

		92	93
PROJECT: 3257	HELMET-MOUNTED SYSTEMS TECHNOLOGY	$ 4.9M	$ 4.5M

PE: 63231F — CREW SYSTEMS AND PERSONNEL PROTECTION TECHNOLOGY

CONGRESSIONAL CATEGORY: HUMAN FACTORS

DoD ORGANIZATION: AF

RESPONSIBLE ORGANIZATION: HUMAN SYSTEMS DIVISION

PROJECT SYNOPSIS:

The objective of this Project is to develop helmet-mounted systems technology to improve pilot situational awareness.

These displays use sight and sound so the pilot interacts with the world in a natural, intuitive manner during day or night operations and in adverse weather conditions. Possible future applications include an all-aspect, fire control system which will allow the pilot, just by turning his head, to use the full capability of his air-to-air and air-to-surface weapons. This work supports requirements for a head-steered Forward-Looking Infrared Radar (FLIR) and for improved night vision goggles.

In FY92 plans are to: (a) demonstrate in-flight Interim Night Integrated Goggle Head Tracking System (I-NIGHTS) to improve pilot ability to acquire targets during night operations, (b) continue development of High Voltage Quick Disconnect for application in future helmet-mounted display systems to reduce risks during ejection and emergency ground egress, and (c) study concept of ejection-compatible wide field-of-view night vision system; demonstrate 60 degree field-of-view capability, a 20 degree improvement over current model.

In FY93, plans are to: (a) begin development of Binocular Helmet Display (BHMD) to incorporate 3-D Audio Localization, Laser Protection, Active Noise Reduction, and low power/high resolution display technologies with ejection compatibility, (b) flight test Concept VI Aircrew Night Vision System --

demonstrate reduced ejection risk, increased field-of-view, and higher resolution over current model, and (c) evaluate subsystem technologies to increase the field-of-view, situational awareness, eye protection, and symbology generation to be applied to BHMD development.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) completion of concept evaluation of the I-NIGHTS demonstrating capability to integrate night vision with helmet-mounted head-up display (HUD) technologies, and (b) completion of ground test evaluations of low profile night vision goggles for potential use in ejection-compatible aircraft -- information will be used to reduce risk during design of ejection-compatible systems.

PROGRAM ELEMENT OVERVIEW

PE: 64227F — TRAINING SYSTEMS DEVELOPMENT

CONGRESSIONAL CATEGORY: SIMULATION & TRAINING DEVICES
EDUCATION & TRAINING

DoD ORGANIZATION: AF

FUNDING: FY92 $ 42.2M (FY93 PRESIDENT'S BUDGET)
FY93 $ 37.2M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

This is a continuing Program Element for the development of aircrew and maintenance training techniques and devices.

The objectives of this Program Element are to adapt simulation technology and standards developed in the laboratories and industry to satisfy training requirements, and to develop prototype training devices.

New program starts include the Simulator for Electronic Combat Training in FY91, and the Joint Primary Aircraft Training System (JPATS) in FY92.

The in-house organization responsible for this program is the Training Systems System Program Office (SPO): Aeronautical Systems Division (ASD), Wright-Patterson AFB, OH.

RELATED ACTIVITIES:

There is no unnecessary duplication of effort within the Air Force or the Department of Defense.

PAYOFF/UTILIZATION:

The payoffs of this Program Element are improved training requirements and the development of prototype training devices.

PROJECT OVERVIEW

		92	93
PROJECT: 2325	SIMULATOR DEVELOPMENT ACTIVITIES	$ 3.5M	$ 3.6M
PE: 64227F	TRAINING SYSTEMS DEVELOPMENT		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	DEPUTY FOR TRAINING SYSTEMS		

PROJECT SYNOPSIS:

The objectives of this Project are to: (a) provide funds to conduct engineering development of new aircrew/maintenance training technologies and standards, (b) fund the pre-production of first article training devices to satisfy the customer's training requirements, (c) identify and correct deficiencies in current training capabilities, and (d) develop tools that improve aircraft and simulator concurrency and reduce system life cycle costs.

Research efforts currently planned or underway include an operational evaluation of four visual simulation display technologies designed to determine which low-altitude tasks can be taught with each technology.

Another effort is the Simulator Data Integrity Program (SDIP), which developed a military process standard for the Aircrew Training Equipment source data flow from the weapon system contractor to the training system contractor.

This Project, 2325, is a continuing project that transitions laboratory developments into acquisition requirements.

In FY92, plans are to: (a) develop a handbook to aid in the implementation of the developed SDIP standard, (b) begin a second generation, low-cost, lightweight helmet-coupled image generation and protection device, (c) begin design of a Universal Threat Simulator System, (d) complete the evaluation of visual system display technologies and publish the results, and (e) modify Air Force guidance to reflect changes in the ISD process.

In FY93, plans are to: (A) complete work on Standard DoD universal threat simulator, (b) complete visual system effectiveness study, (d) complete the modification of Air Force guidance on implementing the ISD process, and (d) develop handbooks to assist the application of the standard on maintenance training devices and courseware.

RELATED ACTIVITIES:

There is no unnecessary duplication of effort within the Air Force or the Department of Defense.

PAYOFF/UTILIZATION:

The payoffs of this Project include improved training capabilities through the development of tools that improve aircraft and simulator concurrency and reduce system life cycle costs.

In FY91, specific accomplishments included: (a) determination of flight simulator motion requirements and development of the algorithms for the simulator drive mechanism, (b) completion of development of motion/force cueing module, (c) development of Military Process Standard which will be used on future simulator acquisition, and (d) completion of Baseline Analysis for updating the Instruction System Development (ISD) process.

PROJECT OVERVIEW

		92	93
PROJECT: 2769	SIMULATOR UPDATE DEVELOPMENT/SIMULATOR REQUIREMENTS DEFINITION	$ 3.4M	$ 6.8M
PE: 64227F	TRAINING SYSTEMS DEVELOPMENT		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	DEPUTY FOR TRAINING SYSTEMS		

PROJECT SYNOPSIS:

The objective of this Project is to develop updates to training systems to maintain and improve their supportability and effectiveness.

Initiatives are identified and funded through this project to modify and upgrade existing training systems. Contained within this project are updates to the KC-135 Aircrew Training System (ATS), the C-130 ATS, and AFSPACECOM training systems. The $3.0M increase in FY93 is required to convert KC-135 training from organic to contractor ATS. This effort was identified in DoD DMRD initiative #947. When in place, the initiative will provide $1.5M in savings per year in O&M expenses. This Project is also used to: (a) define requirements for new training systems in the form of tasks to be trained (this supports a Milestone 0 decision), (b) develop options to meet the requirements (this supports a Milestone 1 decision), and (c) build a prototype of one or more of the options to evaluate the training effectiveness of those options.

In FY92, plans include: (a) KC-135 ATS source selection and contract award, (b) complete visual low altitude training system analysis, (c) beginning training requirements definition for new MAC C-130H aircraft, and (d) conducting Front End Analysis (FEA) on mission tasks regarding AFSPACECOM training systems, and how and where each task will best be trained.

In FY93 plans will be made to: (a) continue KC-135 ATS development, (b) complete AFSPACECOM training systems definition/analysis, and (c) begin USAF Academy Computer-Based Training system definition. Increase over FY92 funding is needed to convert KC-135 training from organic to a contractor ATS.

PAYOFF/UTILIZATION:

The payoffs of this Project include improved supportability and effectiveness of flight simulators.

In FY91, specific accomplishments included: (a) development and evaluation of prototypes for the visual low altitude training systems, and (b) replacement of existing C-130 training device computers with computers capable of supporting future modifications to the C-130 ATS.

PROJECT OVERVIEW

		92	93
PROJECT: 2851	STANDARD DOD SIMULATOR DATA BASE/COMMON TRANSFORMATION PROGRAM	$ 3.5M	$ 3.6M
PE: 64227F	TRAINING SYSTEMS DEVELOPMENT		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	DEPUTY FOR TRAINING SYSTEMS		

PROJECT SYNOPSIS:

The objective of this joint-Service Project, conducted under the Joint Logistic Commanders, is to develop a standard DoD digital database library and distribution function, exchange standards, and a database enhancement and generation capability. This minimizes simulator database development redundancy within and among the Services, and will maximize database utility and interoperability.

In FY92, plans will be made to implement Standard Interchange Format (SIF) capability and demonstrate database interoperability between the C-17 and C-141 Aircrew Training Systems, and (b) begin Full Scale Development/Operational Testing (FSD/OT) effort for prototype database standardization system.

In FY93, plans will be made to: (a) conclude the FSD/OT and pre-production support efforts, (b) begin effort for final upgrade of system software and hardware suite, installation, test, training, and data, and (c) modify Defense Mapping Agency Aerospace Center facility to accept system.

PAYOFF/UTILIZATION:

The payoffs of this Project include: (a) minimized database redundancy among the Services, and (b) maximized database interoperability.

In FY91, specific accomplishments included: (a) completion of basic system development and preliminary acceptance testing, (b) completion of preliminary design of rapid database generation and image processing capability, and (c) development and coordination with the Services and industry, a database SIF MIL-STD and contracted systems implementation.

PROJECT OVERVIEW

		92	93
PROJECT: 2901	B-1B WEAPON SYSTEM TRAINER	$ 5.4M	$ 3.7M
PE: 64227F	TRAINING SYSTEMS DEVELOPMENT		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	DEPUTY FOR TRAINING SYSTEMS		

PROJECT SYNOPSIS:

The objective of this Project is to develop aircrew training devices for all B-1B crew members to include mission rehearsal, takeoff and landing, navigation, air refueling, threat analysis/countermeasures, low-level penetration, weapons delivery, and emergency procedures.

In FY92, plans will be made to: (a) deliver Overwing Fairing Modifications on all trainers, and (b) begin development of Weapon System Trainer (WST) Aircraft Flight Software (AFS) Block 4.5 Merge 3 update.

In FY93, plans will be made to: (a) deliver WST AFS Block 4.5 Merge 3 update, (b) incorporate defense stations updates, and (c) complete system developments.

PAYOFF/UTILIZATION:

The payoff of this Project includes the development of training devices to meet the training needs of all B-1B crew members.

In FY91, specific accomplishments included: (a) delivering the final two WSTs and two Mission Trainers, (b) beginning work on WST Interim Version 2.7 upgrade, and (c) accomplishing Mission Generation System Training, Overwing Fairing Fire Detection Phase I, and the Miniature Receive Terminal WST enhancement development efforts.

PROJECT OVERVIEW

		92	93
PROJECT: 2968	MODULAR SIMULATOR DESIGN	$ 2.4M	$ 1.8M
PE: 64227F	TRAINING SYSTEMS DEVELOPMENT		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	DEPUTY FOR TRAINING SYSTEMS		

PROJECT SYNOPSIS:

The objective of this Project is to develop a Military Standard (MIL-STD) for flight simulator software modules.

Standardizing the functions of each simulator module and its interfaces to all other modules (in the Ada programming language) will: (a) allow reuse of software from one simulator to the next, and (b) simplify the job of updating module software to maintain simulator concurrency with aircraft.

In FY92, plans will be made to: (a) complete concept demonstration and validation, (b) develop propulsion module and radar modules, and (c) analyze advanced avionics compatibility for modular simulation.

In FY93, plans will be made to: (a) demonstrate networking capability, (b) publish standards for future acquisitions, (c) incorporate the DoD Standard Database into visual modules, and (d) complete the program.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included the completion of a draft standard for modular simulators, demonstration of the concept, and validation on the F-16 simulator.

PROJECT OVERVIEW

		92	93
PROJECT: 3135	ADVANCED TRAINING SYSTEM (ATS)	$ 7.1M	$ 4.1M
PE: 64227F	TRAINING SYSTEMS DEVELOPMENT		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	DEPUTY FOR TRAINING SYSTEMS		

PROJECT SYNOPSIS:

The objectives of this Project are to: (a) free instructors for individualized instruction in complex, highly technical tasks, (b) promote efficient training methods, and (c) provide rapid course creation and updating.

Changes to the Air Force training environment have resulted in an increased training workload at the Air Training Command (ATC) Technical Training Centers. Increasing equipment complexity, together with greater student instructional needs, combine to heavily tax ATC's instructor resources. The manual ATC system is becoming increasingly inefficient and inflexible. The Advanced Training System (ATS) will support all the major functions in the Technical Training arena, e.g., instructional development, delivery, evaluation, and resource management.

In FY92, plans will be made to: perform the remaining Software Preliminary Design Reviews and Critical Design Reviews (CDR), (b) perform the final Software CDR, and (c) begin development of courseware and evaluation modules.

In FY93, plans will be made to: (a) complete Development Test and Evaluation, (b) begin development of schedule/management modules, and (c) begin Operational Test and Evaluation.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) completion of the Interface Control Documents for external system interfaces, (b) completion of the Software Specification Review and the Hardware and Software Preliminary Design Reviews, and (c) distribution of new Computer Resources Life Cycle Management Plan.

PROJECT OVERVIEW

		92	93
PROJECT: 3282	C-17 AIRCREW TRAINING SYSTEM (ATS)	$ 3.0M	$ 1.1M
PE: 64227F	TRAINING SYSTEMS DEVELOPMENT		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	DEPUTY FOR TRAINING SYSTEMS		

PROJECT SYNOPSIS:

The objective of this Project is to provide the initial and continuation training for C-17 aircrew members.

Training will be totally contractor administered and supported, with the Military Airlift Command (MAC) evaluating the final product - a fully qualified aircrew member. The training system will be developed concurrently with the aircraft development and production efforts, allowing the first Main Operating Base (MOB) to be available for training at the initial squadron.

In FY92, plans will be made to: (a) conduct site training readiness review at Charleston Air Force Base (AFB), (b) complete basic courseware development, (c) train initial squadron crews at Charleston AFB, (d) continue fabrication of training devices for Altus AFB, and (e) begin modifying developmental unit to maintain concurrency with aircraft.

In FY93, plans will be made to: (a) develop and incorporate all outstanding (aircraft driven) training change requirements, (b) complete advanced (Airdrop) courseware, and (c) deliver Altus AFB Training Device.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) completing the Critical Design Review, (b) initiating fabrication of training devices, (c) continuing courseware and software development, and (d) initiating development of Training System Support Center (TSSC).

PROJECT OVERVIEW

		92	93
PROJECT: 3772	C-141 AIRCREW TRAINING SYSTEM (ATS)	$ 3.9M	$ 1.0M
PE: 64227F	TRAINING SYSTEMS DEVELOPMENT		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	DEPUTY FOR TRAINING SYSTEMS		

PROJECT SYNOPSIS:

The objective of this Project is a totally contracted effort for the ground and flight simulation aircrew training programs, including initial qualification, upgrade and continuation training, for all HQ MAC (Headquarters, Military Airlift Command), HQ AFRES (Headquarters, Air Force Reserves), and ANG (Air National Guard) C-141 primary crew members. The system will also include the Basic Flight Engineer School at Altus AFB.

The contractor will also provide for the logistics support of all Aircrew Training System (ATS) associated training equipment, and operate a training management system to track student progress, update the training programs, and interface with the Air Force Operations Resource Management System. The ATS will include both active and Air Reserve Component C-141 operating locations.

In FY92, plans will be made to: (a) upgrade the second simulator system at Altus, duplicating capabilities of the first system, (b) complete formal school development, (c) deliver computer-based training, and (d) begin incremental Course Readiness Reviews (CRRs) to validate courseware development.

In FY93, plans will be made to: (a) begin training validation, (b) finish courseware development, and (c) complete CRRs to validate courseware.

PAYOFF/UTILIZATION:

The payoff of this Project includes the development of training courses for both ground and flight crews, and a training management system to track student progress.

In FY91, specific accomplishments included: (a) upgrading the prototype training equipment for Altus AFB; the system now has an advanced visual system, 6 Degree of Freedom motion capability, and modified simulator flight data software, (b) continuing ATS courseware development, and (c) completing the prototype Training Management System (TMS).

PROJECT OVERVIEW

		92	93
PROJECT: 3775	MANPOWER, PERSONNEL, AND TRAINING (MPT)	$ 0.7M	$ 0.5M
PE: 64227F	TRAINING SYSTEMS DEVELOPMENT		
CONGRESSIONAL CATEGORY:	MANPOWER & PERSONNEL		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	DEPUTY FOR TRAINING SYSTEMS		

PROJECT SYNOPSIS:

The objective of this Project is to develop training courses for personnel who are involved in identifying requirements and constraints for new acquisitions or modifications.

This Project sponsors research and development of Manpower, Personnel and Training (MPT) tools, models, and databases. It mandates early analysis and integration of human factors in system design and engineering, and emphasizes the most effective and efficient use of personnel to lower life-cycle costs.

In FY92, plans will be made to: (a) complete the development of the System Integration Specialist Course, (b) continue front-end analysis/requirement identification, (c) complete the MPT integrated database, and (d) develop analysis models and tools.

In FY93, plans will be made to: (a) conduct MPT courses and seminars, (b) continue front-end analysis work, and (c) continue work on analysis models and tools.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) development of the Developed System Integration Course, (b) conducting front-end analysis/requirement identification, and (c) development of the MPT integrated database and update of the training courses.

PROJECT OVERVIEW

		92	93
PROJECT: 4022	SIMULATOR FOR ELECTRONIC COMBAT TRAINING (SECT)	$ 8.0M	$10.7M
PE: 64227F	TRAINING SYSTEMS DEVELOPMENT		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	DEPUTY FOR TRAINING SYSTEMS		

PROJECT SYNOPSIS:

The objective of this Project is to train United States Air Force (USAF), Canadian, and other allied officers in basic threat recognition and associated electronic combat procedures in a simulated airborne environment.

The Simulator for Electronic Combat Training (SECT) will replace outdated simulation devices that support Electronic Warfare Officer Training. This training is possible only with simulation due to environment, security, and range restrictions.

In FY92, plans will be made to: (a) award the contract (tentatively scheduled for 30 April 92), and (b) complete the Preliminary Design Review (PDR).

In FY93, plans will be made to: (a) complete the system design and begin hardware/software development, (b) complete the Critical Design Review, (c) begin in-plant test of the system, and (d) increase FY92 funding level based upon 30 April 92 contract award, resulting in expanded program effort in FY93.

Further plans will be made to deliver the system and complete acceptance testing.

PAYOFF/UTILIZATION:

The payoffs for this Project include provision of Electronic Warfare Officer Training using simulation in order to compensate for environment, security, and range restrictions.

In FY91, specific accomplishments included: (a) completion of the training requirements analysis, and (b) the release of the Request for Proposal (RFP).

PROJECT OVERVIEW

		92	93
PROJECT: 4033	JOINT PRIMARY AIRCRAFT TRAINING SYSTEM (JPATS)	$ 1.3M	$ 0.4M
PE: 64227F	TRAINING SYSTEMS DEVELOPMENT		
CONGRESSIONAL CATEGORY:	SIMULATION & TRAINING DEVICES		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	DEPUTY FOR TRAINING SYSTEMS		

PROJECT SYNOPSIS:

The objective of this Project is for both the Navy and Air Force to jointly acquire an integrated training system using similar hardware with like capabilities.

Pilot training is being modified from the current single-track system into a more specialized system. To do this, training will consist of a single track primary phase and a dual track advanced phase. The primary phase is the Joint Primary Aircraft Training System (JPATS). This Project represents the ground-based training portion of the system. Components of the system include simulators, curricula, contract logistic support, and aircraft.

This Project is a new start in FY92.

In FY92, plans will be made to: (a) perform JPATS/SUPT Integration Study to identify areas of commonality/conflict with the other SUPT systems, (b) conduct a front-end requirements analysis study, and (c) establish the System Management Office.

In FY93, plans will be made to: (a) build and release draft Request for Proposal, and (b) conduct Source Selection.

PAYOFF/UTILIZATION:

The payoff for this Project is to provide the Navy and the Air Force with the ground-based training portion of a jointly-acquired, integrated training system using similar hardware with like capabilities.

PROGRAM ELEMENT OVERVIEW

PE: 64243F MANPOWER, PERSONNEL, AND TRAINING DEVELOPMENT

CONGRESSIONAL CATEGORY: MANPOWER & PERSONNEL
EDUCATION & TRAINING
HUMAN FACTORS

DoD ORGANIZATION: AF

FUNDING: FY92 $ 2.5M (FY93 PRESIDENT'S BUDGET)
FY93 $ 3.3M (FY93 PRESIDENT'S BUDGET)

PE SYNOPSIS:

The objective of this Program Element is to provide engineering development to Manpower, Personnel, and Training (MPT) technologies to improve the effectiveness of Air Force (AF) training development/delivery, performance assessment, personnel acquisition, job assignment, force management, and human performance in weapon systems.

The in-house managing organization responsible for this program is the Human Systems Division, Brooks AFB, TX.

RELATED ACTIVITIES:

There is no unnecessary duplication of effort within the Air Force or the Department of Defense.

PAYOFF/UTILIZATION:

The payoffs anticipated from this Program Element include improved effectiveness of AF training development/delivery, performance assessment, personnel acquisition, job assignment, force management, and human performance in weapons systems.

PROJECT OVERVIEW

		92	93
PROJECT: 3816	PILOT CANDIDATE SELECTION METHOD (PCSM)	$ 0.6M	$ 0.1M

PE: 64243F — MANPOWER, PERSONNEL, AND TRAINING DEVELOPMENT

CONGRESSIONAL CATEGORY: MANPOWER & PERSONNEL

DoD ORGANIZATION: AF

RESPONSIBLE ORGANIZATION: HUMAN SYSTEMS DIVISION

PROJECT SYNOPSIS:

The objective of this Project is to provide assessment tools to enable the Air Force to select the best qualified applicants for Specialized Undergraduate Pilot Training (SUPT).

The Pilot Candidate Selection Method (PCSM) will field a Test Processing Station and up to 250 computerized testing stations, called Basic Attributes Testers (BATS), at AFROTC detachments, selected AF bases, and Military Entrance Processing Stations. Research by the Armstrong Laboratory has demonstrated that PCSM will produce test scores that are highly predictive of future pilot training performance.

In FY92, plans are to: (a) conduct Equivalency Testing of the 25 prototype BATS, (b) complete development of the Test Processing Station, (c) conduct Operational Test and Evaluation, and (d) complete production of the PCSM test devices for Air Training Command (ATC).

In FY93, plans are to develop improved predicter tests for the test battery.

RELATED ACTIVITIES:

Program Elements 62205F, Personnel, Training, and Simulation and 84748F, Flight Screening.

There is no unnecessary duplication of effort within the Air Force or the Department of Defense.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments included: (a) production of 25 prototype BATS and software coding to verify and validate the new design, (b) integration of a specialized training predictor into test battery, and (c) beginning development of the Test Processing Station which computes and compiles pilot applicant test data.

PROJECT OVERVIEW

		92	93
PROJECT: 3817	BASE TRAINING SYSTEM (BTS)	$ 0.7M	$ 0.2M
PE: 64243F	MANPOWER, PERSONNEL, AND TRAINING DEVELOPMENT		
CONGRESSIONAL CATEGORY:	EDUCATION & TRAINING		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	HUMAN SYSTEMS DIVISION		

PROJECT SYNOPSIS:

The new and increasingly complex weapon systems and rapidly changing technology combined with major force reductions require personnel to be more efficient in the performance of their assigned duties. The Air Force needs a more efficient system for training management.

Base Training System (BTS) is a computerized management system for all enlisted speciality and officer and civilian ancillary training which will improve management, administration, scheduling, and record keeping. The system is composed of Air Force standard computer hardware and customized software.

In FY92, plans are to: (a) produce and install one BTS system at Randolph AFB, (b) complete full scale development of the BTS, (c) conduct operational test and evaluation of the BTS, and (d) prepare plans to support AF-wide implementation of BTS.

In FY93, plans are to: (a) complete Project Acquisition Strategy Approval Process for the BTS, (b) conduct contract Source Selection for BTS, and (c) award BTS Production/Implementation Contract.

RELATED ACTIVITIES:

Program Element 63227F Personnel, Training and Simulation Technology.

There is no unnecessary duplication of effort within the Air Force or the Department of Defense.

PAYOFF/UTILIZATION:

In FY91, specific accomplishments for this Project included: (a) awarded contract to begin full scale development of the BTS, (b) conducted economic analysis of BTS Program, (c) completion of systems design, and (d) completion of hardware installation at Randolph AFB.

PROJECT OVERVIEW

		92	93
PROJECT: 3818	MAINTENANCE SKILLS TUTORS (MST)	$ 1.2M	$ 3.1M
PE: 64243F	MANPOWER, PERSONNEL, AND TRAINING DEVELOPMENT		
CONGRESSIONAL CATEGORY:	HUMAN FACTORS		
DoD ORGANIZATION:	AF		
RESPONSIBLE ORGANIZATION:	HUMAN SYSTEMS DIVISION		

PROJECT SYNOPSIS:

The objective of this Project is to improve training of complex maintenance troubleshooting skills for a broad range of Air Force jobs by having Maintenance Skills Tutors (MST) field multiple computer-based tutors for the Tactical Air Forces (TAF).

This is not initial skills training, but involves the more difficult skills of understanding and troubleshooting problems that the maintenance-aiding equipment and systems are unable to diagnose.

Significant additional funding was added to this project in FY93 to support the new contract award for development of the common software and the tutor for F-16 flightline engine mechanics.

In FY92, plans are to: (a) conduct trade-off analyses between design options to determine the optimal combinations of systems capability, supportability, and maintainability for MST, (b) analyze development and life-cycle cost estimates for each design option and determine the most cost-effective system option for MST, and (c) develop and define a generic MST architecture design that identifies the software components which will be common to all tutor implementations, maximizes the re-use of code, and minimizes the development cost of each subsequent MST implementation.

In FY93, plans are to: (a) award contract to begin development of the MST common software and the development of a tutor for F-16 flightline engine mechanics, (b) conduct cognitive task analyses to extract and quantify expert knowledge from TAC F-16 flightline engine mechanics, (c) conduct preliminary Design Review for the MST common software architecture, (d) develop

instructional content and design for the F-16 flightline engine mechanic tutor, and (e) conduct critical design review for the MST common software and the F-16 engine mechanic tutor.

PAYOFF/UTILIZATION:

Accomplishments of FY91 include: (a) development of MST design options and life cycle cost estimates for hardware and software, and (b) determination that current TAC computer training hardware systems were not adequate to support future TAC requirements or MST requirements. Began evaluation of the projected hardware systems to be acquired under the Desk Top IV contract.

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III-C-1: LISTING OF AIR FORCE PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
61102F						DEFENSE RESEARCH SCIENCES
2313	AL	9.482	10.799	HF	4	HUMAN RESOURCES
		9.483	10.799		TOTAL IN PE	

TOTAL FUNDING IN PROGRAM ELEMENT 61102F :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	9.482	10.799

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III-C-1: LISTING OF AIR FORCE PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
62202F						HUMAN SYSTEMS TECHNOLOGY
06MD	AL	4.262	5.104	HF	4	HUMAN SYSTEMS DIVISION LABORATORY OPERATIONS
6893	AL	1.250	1.414	HF	4	MANNED WEAPON SYSTEMS EFFECTIVENESS
7184	AL	6.499	9.276	HF	4	MAN-MACHINE INTEGRATION TECHNOLOGY
		12.012	15.795			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 62202F :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	12.011	15.794

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III-C-1: LISTING OF AIR FORCE PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
62205F						PERSONNEL, TRAINING, AND SIMULATION
06HT-ET	AL	6.534	7.416	ET	VAR	LABORATORY SUPPORT
06HT-HF	AL	2.107	2.705	HF	VAR	LABORATORY SUPPORT
06HT-MP	AL	1.897	1.899	MP	VAR	LABORATORY SUPPORT
1121	AL	3.607	3.895	ET	6	TRAINING DEVELOPMENT AND ASSESSMENT TECHNOLOGY
1123	AL	8.185	8.911	ET	6	AIRCREW TRAINING TECHNOLOGY
1710	AL/HRD	3.917	4.676	HF	4	LOGISTICS AND MAINTENANCE TECHNOLOGY
7719	AL	3.469	3.275	MP	2	FORCE ACQUISITION AND DISTRIBUTION SYSTEM
		29.717	32.778			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 62205F :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	29.716	32.777

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III-C-1: LISTING OF AIR FORCE PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
63106F						LOGISTICS SYSTEMS TECHNOLOGY
2745	AL	0.500	3.500	HF	4A	LOGISTICS FOR COMBAT WEAPON SYSTEM MAINTENANCE AND SUPPORT
2940	AL	5.649	7.897	HF	4D	TECHNOLOGY FOR DESIGN AND MAINTENANCE
2950	AL	0.000	3.588	HF	4D	IMPROVED LOGISTICS AND MAINTENANCE PERFORMANCE
		6.150	14.986			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 63106F :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	6.149	14.985

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III-C-1: LISTING OF AIR FORCE PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
63227F						PERSONNEL, TRAINING, AND SIMULATION TECHNOLOGY
2743	AL	5.619	5.911	ST	6	MULTI-SHIP TRAINING RESEARCH AND DEVELOPMENT
2922	AL	1.725	1.228	MP	2	MANPOWER AND FORCE MANAGEMENT
2949	AL	2.057	2.450	ET	6	ADVANCED TRAINING TECHNOLOGIES
		9.401	9.590			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 63227F :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	9.401	9.589

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III-C-1: LISTING OF AIR FORCE PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
63231F						CREW SYSTEMS AND PERSONNEL PROTECTION TECHNOLOGY
2829	HSD	4.256	4.216	HF	4	CREW-CENTERED COCKPIT DESIGN
2992	AL	0.773	0.000	HF	4	SPACE CREW ENHANCEMENT (SPACE)
3257	HSD	4.907	4.476	HF	4	HELMET-MOUNTED SYSTEMS TECHNOLOGY
		9.937	8.693			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 63231F :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	9.936	8.692

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III-C-1: LISTING OF AIR FORCE PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
64227F						TRAINING SYSTEMS DEVELOPMENT
2325	TS SPO	3.500	3.550	ST	6	SIMULATOR DEVELOPMENT ACTIVITIES
2769	TS SPO	3.399	6.800	ST	6	SIMULATOR UPDATE DEVELOPMENT/SIMULATOR REQUIREMENTS DEFINITION
2851	TS SPO	3.500	3.600	ST	6	STANDARD DOD SIMULATOR DATA BASE/COMMON TRANSFORMATION PROGRAM
2901	TS SPO	5.354	3.700	ST	6	B-1B WEAPON SYSTEM TRAINER
2968	TS SPO	2.400	1.800	ST	6	MODULAR SIMULATOR DESIGN
3135	TS SPO	7.077	4.100	ET	6	ADVANCED TRAINING SYSTEM (ATS)
3282	TS SPO	3.000	1.100	ET	6	C-17 AIRCREW TRAINING SYSTEM (ATS)
3772	TS SPO	3.911	1.000	ET	6H	C-141 AIRCREW TRAINING SYSTEM (ATS)
3775	TS SPO	0.700	0.500	MP	2A	MANPOWER, PERSONNEL, AND TRAINING (MPT)
4022	TS SPO	7.974	10.674	ST	6	SIMULATOR FOR ELECTRONIC COMBAT TRAINING (SECT)
4033	TS SPO	1.337	0.400	ST	6	JOINT PRIMARY AIRCRAFT TRAINING SYSTEM (JPATS)
		42.153	37.225			TOTAL IN PE

(CONTINUED)

(CONTINUATION WITHIN PE 64227F)

III-C-1: LISTING OF AIR FORCE PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES

TOTAL FUNDING IN PROGRAM ELEMENT 64227F :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	42.152	37.224

(CONTINUED)

(CONTINUATION)

III-C-1: LISTING OF AIR FORCE PROJECTS

PE/PROJECT	PERFORMING ORGANIZ.	FY92 ($M)	FY93 ($M)	CONG CAT	GOAL	PE/PROJECT TITLES
64243F						MANPOWER, PERSONNEL, AND TRAINING DEVELOPMENT
3816	HSD	0.635	0.100	MP	2D	PILOT CANDIDATE SELECTION METHOD (PCSM)
3817	HSD	0.656	0.154	ET	6F	BASE TRAINING SYSTEM (BTS)
3818	HSD	1.218	3.046	HF	4A	MAINTENANCE SKILLS TUTORS (MST)
		2.510	3.300			TOTAL IN PE

TOTAL FUNDING IN PROGRAM ELEMENT 64243F :	FY92	FY93
THE PRESIDENT'S BUDGET, JANUARY 1992	2.509	3.300

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